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A. M. Gardner, M.D

CONSPECTUS

OF

ORGANIC MATERIA MEDICA

AND

PHARMACAL BOTANY,

COMPRISING

THE VEGETABLE AND ANIMAL DRUGS:

THEIR PHYSICAL CHARACTER, GEOGRAPHICAL ORIGIN, CLASSIFICATION, CONSTITUENTS, DOSES, ADULTERATIONS, &c.

TABLE OF THE TESTS AND SOLUBILITIES OF THE ALKALOIDS APPENDED.

By L. E. SAYRE, PH. G.

DETROIT:
GEORGE S. DAVIS, MEDICAL BOOK PUBLISHER,
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PREFACE.

THE following pages are the result of time and study devoted to the interest of students of Materia Medica. A mere glance over the matter, and the objects in view will be plainly seen. It is not to give an exhaustive treatise upon this subject in all its sections and ramifications, but to direct special attention to Drugs proper, their characteristics, botanical and geographical origin; the salient points are brought out and a clearly arranged bird's eye view is displayed. The Chart which begins the book, gives the Medical properties, doses, &c., it is so arranged that it can be readily referred to and studied. The subjects of Medical Botany and Materia Medica which follow, are divided in such a systematic manner and so illustrated as to make them, if possible, attractive and instructive to the student, and to tempt him to a pursuit after more detailed information and thorough knowledge, in fuller manuals and more important text books. A complete table of the alkaloids is presented, giving their tests, solubilities, &c.; lastly a table of antidotes and incompatibles. The need and importance of such a work have long been felt by the author in teaching. Students of Pharmacy and Medicine lose a good deal of valuable time in finding out what to learn—in getting a clear idea of the scope of these subjects. In treating of Drugs proper, their characteristics have been especially dwelt upon. This portion of Materia Medica has been very much neglected by most students, and consequently they are liable to become but superficial observers in this important branch. It is to be hoped the description here presented will not only be a help over rough ground, but excite an interest in one of the most attractive and improving parts of the Science.

In the compilation of the work, the standard text books have been followed. Among those more especially referred to are the

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Pharmacographia, United States Dispensatory, Gray's Botany, &c. The author, naturally enough, followed the valuable classification of Prof. John M. Maisch, in the arrangement of Drugs, which he feels needs only be studied to be fully appreciated. Undoubtedly none could be devised that would convey more abundant information as to the physical characteristics of Drugs.

The author desires to state that he is peculiarly indebted to Mr. Jacobs, of Athens, Georgia, whose assistance in the labor has been invaluable; more especially has this been the case in the department of Characteristics of Drugs, and in the Chemical Chart, most of the details of which have been due to his intelligent aid.

L. E. SAYRE.

PHILADELPHIA, *January* 1, 1879.

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CHART OF BOTANIC

NATURAL ORDER.	OFFICINAL NAME.	BOTANICAL NAME.	COMMON NAME.	HABITAT.	PART USED
Algaceæ,	Chondrus.	Chondrus crispus.	Irish Moss, Carrageen.	S. & W. Coast Ireland. Atlantic Coast U. S.,	Frond—Whole plant,
Anacardiaceæ.	Mastiche.	Pistacia Lentiscus.	Mastich.	Mediterranean Coast,	Concrete resinous exud.,
	Rhus Glabrum.	Rhus glabrum.	Sumach.	U. S.,	Fruit (Berry,)
	Toxicodendron,	Rhus Toxicodendron.	Poison Oak.	"	Leaves,
Apocynaceæ.	Apocynum Androsaemifolium.	Apocynum andros.	Dogs-bane.	"	Root,
	Apocynum Cannabinum.	Apocynum cannabinum.	Indian Hemp.	"	"
Aquifoliaceæ.	Prinos.	Prinos verticillatus.	Black Alder.	"	Bark,
Araceæ,	Dracontium.	Symplocarpus fœtidus. D. fœtidum. Ictodes fœtidus.	Skunk Cabbage.	"	Rhizome,
	Calamus.	Acorus Calamus.	Calamus. Sweet Flag,	" Europe,	"
Araliaceæ.	Aralia Nudicaulis.	Aralia nudicaulis.	False Sarsapa. Spikenard.	"	Root,
	Aralia Spinosa.	Aralia spinosa,	Aralia, Angelica tree.	"	Bark,
	Panax.	Panax quinquefol.	Ginseng.	"	Root,
Aristolochiaceæ,	Serpentaria.	Aristolochia Serpentaria. A. reticulata.	Virginia Snake Root.	"	Rhizome,
	Asarum.	Asarum Canadense,	Canada Snake Root. Wild Ginger.	"	"
Asclepiadaceæ,	Asclepias Incarnata.	A. incarnata.	Flesh-Colored Asclepias.	"	"
	Asclepias Syriaca.	A. Syriaca. (L) A. cornuti.	Milk-weed. Silk-weed.	"	"
	Asclepias Tuberosa.	A. tuberosa.	Butterfly-weed Pleurisy root,	"	Root,
Aurantiaceæ.	Aurantii Amari Cortex.	Citrus vulgaris.	Bitter Orange peel.	S. Europe, S. U. S.,	Rind of the fruit,
	Aurantii Dulcis Cortex.	Citrus Aurantium.	Sweet Orange peel.	S. Europe, S. U. S.,	Rind of the fruit.
	Aurantii Flores	C. Aurantium. C. vulg.,	Orange Flowers.	S. Europe, S. U. S.,	Flowers,
	Limonis Cortex,	C. Limonum.	Lemon peel.	S. Europe. S. U. S.,	Rind
	Limonis Succus,	" "	Lemon juice.	S. Europe. S. U. S.,	Juice,
	Oleum Bergamii,	C. Limetta.		S. Europe, S. U. S.,	Oil.
	Oleum Limonis.	C. Limonum.		S. Europe. S. U. S.,	Oil.
Berberidaceæ.	Podophyllum.	P. peltatum.	May Apple.	U. S.,	Rhizome,
	Berberis.	B. vulgaris,	Barberry.	"	Bark of Root,
Burseraceæ.	Myrrha.	Balsamodendron Myrrha.	Myrrh.	Arabia.	Exudation,
Canellaceæ,	Canella.	C. alba,	Canella.	West India Islands, Jamaica, &c.	Bark.
Cannabinaceæ. (Sub-order of Urticaceæ.)	Cannabis Americana.	C. sativa. Var. Americana.	Amer. Hemp.	U. S.	Flowering tops.
	Cannabis Indica.	C. sativa. Var. Indica.	Indian Hemp.	India.	Flowering tops of female plant.
Caprifoliaceæ,	Sambucus.	S. Canadensis.	Elder flowers.	U. S.	Flowers.
	Triosteum.	T. perfoliatum.	Fever Root.	"	Root.
Celastraceæ.	Euonymus.	E. atropurpureus.	Wahoo.	"	Bark.
Chenopodiaceæ.	Chenopodium.	C. anthelminticum.	Worm Seed.	N. America.	Fruit.

ATERIA MEDICA.

NSTITUENTS.	MED. PROP.	DOSE.	OFFICINAL PREPARATIONS.
geenin (var. of n,)	Demulcent,	ʒ ½ or ad. lib.	
ein, Resin, Vol.	Rubefacient,	Grs. 5,	Pilulæ Aloes et Mastiches.
Acid, Acid Ma- of Calcium,	Refrigerant Astringent.		
dendric Acid, , Resin.	Stimulant, narcotic,	Grs. ½ to 1,	
il, Bitter Ex- ive,	Tonic. Laxative	Grs. 10 to 15,	
nin, Tannin & ic Acid,	Emetic & Cath.	Grs. 5 to 6,	
Acid,	Tonic Astrin.,	Grs. 30 to 40,	
il,	Stimulant,	Grs. 10 to 20,	
	Aromatic Stim.	Grs. 20 to 40,	
	Arom. Alterative,	Grs. 20 to 40,	
	Stim. Diaph.,		
uilon.	Demulcent,		
il (5 per ct.), n, Gum,	Tonic Stim.,	Grs. 10 to 30,	Ext. Fl'd. Infus., Tinct., Tinct., Cinch. Co.
il (2 per ct.). n, Gum,	Arom. Stim..	Grs. " "	
ione,	Altera. Cath.,	Grs. " "	
	"	Grs. " "	
ar principle, nin,	Diaph. Expect.	Grs. 20 to 40,	
ridin Vol. Oil,	Tonic,	ʒ ½ to 1,	Inf. Gent.. Comp. Tinct., Tr. Gent Co., Tr. Cinch. Co.
il,	Aromatic,	" "	Confect., Syrup.
il,	Nervous Stim..		Aqua.
ridin Vol. Oil,	Stomachic,		
Acid, Gum & ar,	Refrigerant,		Mist. Potass. Cit., Syr. Limonis.
a Camphor,			
" "			Sp. Ammon. Aromat., Syr. Acidi Cit.
Resins— one sol. ther, (⅓) one in- (⅔) in Ether,	Cathartic,	Grs. 5 to 20,	Ext., Resina.
rina,	Tonic, Cathartic	ʒ 1,	
il, Resin, Gum,	Stim., Expect., Emmen,	Grs. 5 to 30,	Mist. Ferri Comp., Pil. Aloes et Myrrh.. Pil. Ferr. Comp., Pil. Galbani Comp., Pil. Rhei Comp., Tinct. Aloes et Myrrh.. Tinct. Myrrh.
nic Acid Vol. Oil, nite,	Aromatic, Stim.	℈ 1 to 3,	Pulv. Aloes et Canellæ, Vinum Rhei.
Vol. Oil,	Narcot., Antispasm.,	Grs. 3 to 5.	Ext.
"	" "	" " "	Ext., Tinct.
age, Sugar & ,	Altera., Sudorific,	ʒ 2,	
	Cath., Diuretic,	Grs. 20 to 30,	
min Asparagin,	Tonic, Laxative,	Grs. 15 to 30,	
il,	Anthelmintic,	℈ 1 to 2,	Ol. Vol.

NATURAL ORDER.	OFFICINAL NAME.	BOTANICAL NAME.	COMMON NAME.	HABITAT.	PART USED
Cinchonaceæ. Sub-order of Rubiaceæ.	Caffea.	C. Arabica.	Coffee.	Liberia, Brazil, &c.,	Seed,
	Cinchona Flava.	C. calisaya.	Calisaya Bark.	S. America,	Bark.
	Cinchona Pallida.	C. Condaminea & C. micrantha.	Pale Bark.	" "	"
	Cinchona Rubra.	C. succirubra.	Red Bark.	" "	"
Cistaceæ.	Helianthemum.	Helianthemum Canadense.	Frostwort,	N. America.	Herb,
Compositæ.	Absinthium.	Artemisia Absinthium.	Wormwood.	Europe, U. S.	Tops and leaves,
	Anthemis.	A. nobilis,	Roman Chamomile	Europe.	Flowers,
	Arnica.	A. montana.	Arnica. Leopard's-bane.	Parts of Europe,	"
	Erigeron,	E. heterophylum. E Philadelphicum.	Flea-bane.	U. S.	Leaves and tops,
	Erigeron Canadense.	Erigeron Canadense	Canada Flea-bane.	N. & Middle U. S.,	Lvs. & tops,
	Eupatorium.	E. perfoliatum,	Thoroughwort or Boneset.	U. S.,	" "
	Lactucarium.	Lactuca sativa.	Lactucarium.	Europe—warm parts.	Concrete Juice,
	Matricaria.	Matricaria Chamomilla.	German Chamomile.	Europe.	Flowers,
	Santonica,	Artemisia Cina.	Levant Wormseed,	Persia, Asia Minor, &c.,	Unexpand. flowers.
	Taraxacum.	T. Dens-leonis.	Dandelion.	U. S.,	Root,
	Achillea,	Achillea millefolium	Yarrow.	"	Lvs. & tops
	Carthamus.	C. tinctoria.	Safflower.	India, Levant & Egypt,	Florets,
	Cotula.	Anthemis Cotula. Maruta Cotula.	May Weed.	U. S. & Europe,	Herb.
	Inula,	I. Helenium.	Elecampane.	U. S. & Europe,	Root,
	Lappa.	L. minor.	Burdock.	U. S. & Europe.	"
	Pyrethrum.	Anacyclus Pyrethrum.	Pellitory.	S. E. Asia, Mediterranean Coast.	"
	Solidago,	S. odora.	Golden Rod.	N. A.,	Lvs. & top
	Tanacetum,	T. vulgare.	Tansy,	Europe,	" "
Coniferæ.	Juniperus,	J. communis.	Juniper.	"	Fruit,
	Oleum Succini,		Oil of Amber.	Ports of Baltic,	
	Oleum Terebinthinae,	Pinus palustris and other species,	Spts. Turpentine,	S. U. S.,	
	Pix Burgundica,	Abies excelsa.	Burgundy Pitch,	Europe and N. Asia,	Resinous Exuda
	Pix Canadensis,	Abies Canadensis,	Canada Pitch.	Canada & Nova Scotia,	Resinous Exuda
	Pix Liquida,	Pinus palustris and other species,	Tar,	Southern U. S.,	Imp. Tu from wood,
	Resina,	Pinus palustris and other species,	Rosin,	Southern U. S.,	Residue from d tillati of Tur entine.
	Sabina,	Juniperus Sabina,	Savin.	Europe,	Tops,
	Terebinthina,	Pinus palustris and other species,	Gum Turpentine,	U. S.,	Concrete Oleo. R
	Terebinthina Canadensis,	Abies balsamea,	Balsam Fir.	Canada,	Resinous Exuda
	Juniperus Virginiana,	J. Virginiana.	Red Cedar,	U. S.,	Tops,

STITUENTS.	MED. PROP.	DOSE.	OFFICINAL PREPARATIONS.
ı, Caffeotan- ɔid, . . .	Stimulant, .		
a, Cinchonia, idia, Cinchoni- Kinic & Cincho ic Acid, Cincho- ed, Kinovin, &c.	Antiperiodic, and Tonic,	Grs. 10 to 60,	(Yellow.) Decoct., Ext. Fld., Ext.. Inf., Tr., Quinia Sulph. (Red.) Decoct., Inf., Tr. Cinch. Comp.
, . . .	Aromatic, Astringent, . .	Grs. 5 to 20,	
ıin, Vol. Oil & . . .	Anthelmintic, Tonic,	℈ 1 to 2, . .	
l, Bitter Prin- . . .	Tonic Carminative.	ʒ ½ to 1 , .	Infus.
ıa, Gallic Acid, ...	Stim., Diaph.	Grs. 5 to 10,	Tr., Ext.
l, coloring, &c.,	Diuret., Astrin.	Grs. 20 to 30.	
l, . .	Tonic, Diuretic Astring., .	·	Ol, Vol. Ext. Fl.
, Chlorophyl, &c., . .	Tonic, Diaphoretic, .		Infus.
erin, Lactucin. ıcic Acid, .	Sedative, Narcotic, -	Grs. 3 to 15,	Syrupus.
l. . . .	Mild Tonic, .	ʒ ½ to 1, .	
l (1 per cent.), ɔnin, . .	Anthelmintic,	Grs. 5 to 30,	Santonin.
cin, Inulin, Su- . . .	Tonic, Diuretic and Aperient,	ʒ 1 to 2, .	Ext. Fld., Ext., Infus.
il, Bitter Ext. in. &c., .	Aromat., Astring., .		
mic Acid, Yel- ε Red coloring ɛr, . . .	Laxative, .		
l, &c., . -	Tonic, - .		
Helenin, Gum, ...	Tonic, Demulcent, . .	℈ 1 to ʒ1, .	
& Sugar, .	Aperient, Diuretic, . .	ʒ 1, . .	
l. Pyrethrin, ic Acid a trace.	Sialagogue, .	Grs. 20 to 30.	
l, . . .	Astring., Arom. and Stim., .		
l, Bitter Ext.,	Arom., Vermifuge & Emenagogue. .		
l (2 per cent.), erin, resin, .	Stimulant, and Diuretic, .		Ol. Vol.. Infus.
	Iritant, .	Gtt. 3 to 15,	Rectified Oil.
	Direct Diaphoretic, Stimu. Anthelmin.,	Gtt. 5 to 60,	Linimentum Cantharides.
& Resin, .			Emp. Antimonii., Ferri., Galbani Co., Opii., Picis-Burg., Picis Cum Cantharide.
" .			Emp. Picis Canadensis.
neous Acid, ote, &c., .	Diuretic, Expectorant,	ʒ ½ to ʒ 1 .	Glyceritum. Infus., Ung.
anhydride of ic Acid,) .			Cer. Canth., Cer. Ext. Canth., Cer. Resinæ, Cer. Res. Co., Emp. Hydrarg.
& soft Resin.	Anthelmintic, Stim., Emenagogue, .	Grs. 5 to 15,	Cer. Sabinæ.. Ext. Fl.
& Resin. .		℈ 1 to ʒi, .	Cer. Res. Co., Emp. Galbani Co.
" .		℈ 1 to ʒ1, .	Charta Cantharidies, Collodium Cum Cantharide, Collodium Flexile,
l, . .	Diuretic, Stim. &c., . .	ʒ ½ to 1, .	

NATURAL ORDER.	OFFICINAL NAME.	BOTANICAL NAME.	COMMON NAME.	HABITAT.	PART USE
Convolvulaceæ,	Jalapa,	Exogonium purga, Ipomoea Jalapa,	Jalap,	Vera Cruz,	Tuber,
	Scammonium,	Convolvulus Scammonia,	Scammony,	Asia Minor,	Resinous Exudation,
Cornaceæ,	Cornus Florida,	C. Florida,	Dogwood,	U. S.,	Bark,
	Cornus Sericea,	C. sericea,	Swamp Dogwood,	“	“
	Cornus Circinata,	C. circinata,	Round leaved Dogwood,	“	“
Cruciferæ,	Sinapis Alba,	S. alba,	White Mustard Seed,	S. Europe,	Seed,
	Sinapis Nigra,	S. nigra,	Black Mustard Seed,	“	“
Cucurbitaceæ,	Colocynthis,	Citrullus Colocynthis,	Colocynth, or Bitter Apple,	N. Africa to Morocco, Up. Egypt. Nubia,	Fruit.
	Elaterium,	Momordica elaterium and Ecbalium agresta,	Squirting Cucumber,	Along the Mediter'n,	Depositio from Juice,
	Pepo,	Cucurbita Pepo,	Pumpkin Seed,	U. S.,	Seed,
Cupuliferæ,	Galla,	Quercus infectoria,	Galls,	Asia Minor, Cyprus & Syria,	Excresence,
	Quercus Alba,	Q. alba,	White Oak Bk.	U. S.,	Inner Bk
	Quercus Tinctoria	Q. tinctoria,	Black “ “	“	“ “
	Castanea,	C. vesca,	Chestnut,	“	Leaves.
Ebenaceæ,	Diospyros,	Diospyros Virginiana,	Persimmon,	“	Unripe Fruit.
Ericaceæ,	Gaultheria,	G. procumbens,	Wintergreen or Partridge berry.	“	Leaves.
	Uva Ursi,	Arctostaphylos uva ursi,	Bear berry,	Eu., Asia & America,	“
Euphorbiaceæ,	Cascarilla,	Croton Eluteria,	Cascarilla,	Bahama Islands,	Bark,
	Oleum Ricini,	Ricinus communis.	Castor Oil.	E. Indies, Africa & Am.	
	Oleum Tiglii,	Croton Tiglium,	Croton “	India,	
	Stillingia,	S. Sylvatica,	Queen's Root.	S. U. S.,	Root,
	Tapioca,	Janipha Manihot,	Tapioca.	W. Ind. & Brazil,	Fecula the R
	Euphorbia Corollata,	E. corollota,	Large flowering Spurge.	U. S.,	Root,
	Euphorbia Ipecacuanha,	E. Ipecacuanha,	American Ipecac,	“	“
	Rottlera,	Rottlera tinctoria,	Kameela,	Hindostan,	Powde Hair Caps
Filices,	Filix Mas,	Aspidium Filix Mas	Male Fern,	Europe,	Rhizon
Fungi,	Ergota,	Claviceps purpurea,	Spurred Rye,	Europe,	Sclerot
Gentianaceæ,	Chiretta,	Agathotes Chirayta.	Chirayta,	Mt. reg. of, No. India,	Herb & Root.
	Gentiana,	G. lutea,	Gentian,	Mt. of Mid. & S. Eu.,	Root,
	Frasera,	F. Walteri,	Am. Columbo,	U. S.,	“
	Gentiana Catesbæi,	G. Catesbæi,	Blue Gentian,	Swamps of N. & S. Carolina,	“
	Sabbatia,	S. angularis,	Am. Centuary,	U. S.,	Herb,
Geraniaceæ,	Geranium,	G. maculatum,	Cranesbill,	U. S. (low grounds,)	Rhizon
Gramiuaceæ,	Amylum,	Triticum vulgare,	Starch,	U. S.,	Fecula
	Avenae Farina,	Avenæ sativa,	Oat Meal,	U. S. & Eu.,	Meal,

STITUENTS.	MED. PROP.	DOSE.	OFFICINAL PREPARATIONS.
Jalapin (7 per . . .	Active Cathartic, . .	Grs. 10 to 20,	Resina, Tinctura.
identical with in, . .	Active Cathar.	Grs. 5 to 15,	Resina.
Bitter Princ., . . .	Tonic, Astring. Antiperiodic,	℈ 1 to 3,	Decoc.. Ext. Fld.
Bitter Princ., . . .	Tonic, Astring. Antiperiodic,	" .	
Bitter Princ., . . .	Tonic, Astring. Antiperiodic,	" .	
, and Myrosin, g Sulphocy- of Acrinyl,	Stimu, Rubefacient, Emetic	(Emetic ʒ 1) Grs. 5 to 10,	
and Myrosin. g Vol. Oil, .	Stimu., Rubefacient, Emetic,	" "	Charta Sinapis.
thin & Colo- itin, . .	Active, Cathartic, . -	Grs 5 to 10,	Extract: (Ext. used in Ext. Colocynth Comp.—Ext. Colocynth Co. used in Pil. Cath. Co.)
n, . .	Hydragogue Cathartic, .	Grs. ½ to 1,	
Oil, Gum, Su- . . .	Tape worm Remedy, .	ʒ 1 to 3, .	
Acid (60 to 70 t.), Gallic (3), . .	Astringent, .	Grs. 10 to 20,	Acid Gallic, Acid Tannic, Ung't., Tinctura.
&c.. . .	Astring., Tonic,	℈ 1 to ʒ 1, .	
" . .	" "	" .	
" . .	" "	Inf. ℥ 1 to 4,	
" . .		ʒ 1 to 2, .	
, Tannin, &c.,	Arom., Stimu. Astring, .	ʒ ½ to 1, .	Ol. Vol.
Gallic Acid,	Astring., Diuretic, . .	℈ 1 to ʒ 1. .	Decoc., Ext. Fld.
l, (1 per ct.),	Arom., Tonic,	Grs. 20 to 60,	Infus.
, Gum, . .	Cathartic, .	ʒ ½ to 2. .	Collodium Cum Cantharide. Collod. Flexile.
Acid Crotonic . . .	Hydragogue Cathartic, .	Gtt. ½ to 2.	
l & Bitter Ext. . . .	Alterative, .	Grs. 15 to 30,	Ext. Fld.
	Expectorant, Purgative, . Diaphoretic	Grs. 1 to 15,	
Starch, Glu-	Expect, Diaph. Emetic,	Grs. 5 to 15,	
Rottlerin, .	Anthelmintic, Purgative,	ʒ 1 to 3, .	
l, Green fatty esin, &c., .	Slightly Tonic, Astring., Anthelmintic, .	ʒ 1 to 3, .	Oleo Resin.
a, Ergotina, , fixed oil, &c.,	Parturient, .	Grs. 10 to 30,	Ext. Fld., Vinum.
sin & Chiratin,	Tonic, . .	Grs. 10 to 20,	
icrin, Gentisic . . .	" . .	Grs. 10 to 40,	Ext., Ext. Fld., Tr. Gent. Comp., Infus. Gent. Co.
Pectin, Wax, , &c., . . .	" . .	Grs. 20 to 60,	
Principle, &c.,	" . .	Grs. 10 to 30,	
Bitter princ., .	" . .	Grs. 15 to 60,	
, &c., . .	Astringent, .	Grs. 20 to 30,	
. . . and Gluten,			

NATURAL ORDER.	OFFICINAL NAME.	BOTANICAL NAME.	COMMON NAME.	HABITAT.	PART US
	Hordeum.	H. distichon.	Barley.	U. S.	Decortica ed Seed
Guttiferæ,	Gambogia.	Garcinia morella.	Gamboge.	China.	Gum Re
Hamamelaceæ.	Styrax.	Liquidambar orientale.	Storax.	Syria. Levant.	Balsam. from B
Iridaceæ,	Crocus.	Crocus sativus.	Saffron:	Greece and Asia Minor.	Stigmas.
	Iris Florentina.	Iris florentina.	Orris Root.	Italy. &c.	Rhizome.
	" Versicolor.	Iris versicolor.	Blue flag.	U. S.	"
Juglandaceæ,	Juglans.	J. cineria,	Butternut.	"	Inner B
Labiatæ.	Cataria,	Nepeta cataria.	Catnip.	"	Lvs.& To
	Hedeoma,	H. Pulegioides.	Amer. Pennyroyal.	"	" "
	Lavandula.	L. vera.	Lavender.	Cult. in U. S., S. Eu., Spn. & Italy.	Flowers.
	Marrubium.	M. vulgare.	Horehound.	U. S.	Lvs.& To
	Mentha Piperita.	M. piperita.	Peppermint.	"	" "
	" Virdis.	M. viridis.	Spearmint,	"	" "
	Monarda.	M. punctata.	Horsemint.	"	" "
	Oleum Thymi.	Thymus vulgaris,	Oil of Thyme.	S. of France.	Essential Oil.
	Origanum,	O. vulgare.	Common Marjoram.	Eu. & U. S.	Herb.
	Rosmarinus.	R. officinalis.	Rosemary.	Borders of Mediter'n.	Leaves.
	Salvia.	S officinalis.	Sage.	Eu. & U. S.	"
	Lycopus.	L. Virginicus.	Bugle weed,	U. S.	Herb.
	Melissa,	M. officinalis.	Balm.	S. Europe.	Lvs.& To
	Scutellaria.	S. caleriflora.	Sculleap.	U. S.	Herb.
Lauraceæ,	Camphora,	C. officinarum.	Camphor.	China Japan. &c.	Concrete subst'n
	Cinnamomum.	C. Zeylanicum and C. aromaticum.	Cinnamon.	Ceylon Isl'nd & China.	Bark.
	Nectandra,	N. Rodiei.	Bebeeru Bark.	Guiana. S. Amer.	"
	Oleum Camphoræ.	Camphora officinarum,	Oil of Camphor.		Ess. Oil.
	" Cinnamomi.	C. Zeylanicum.	" Cinnamon.		"
	Sassafras,	S. officinale.	Sassafras.	U. S.	Bark of Root,
	" Medula,	" "	Pith of Sassaf's	"	Pith of t Stems,
Leguminosæ,	Acacia,	A. vera and other species of A.	Gum Arabic.	Upper Egypt Senegal, &c.	Gummy Exuda
	Balsamum Peruvianum,	Myrospermum Peruiferum,	Balsam of Peru,	Cent. Amer.	Liquid Balsa
	Balsamum Tolutanum,	Myrospermum Toluiferum.	Balsam Tolu,	Peru & Granada.	Semi. So Balsa
	Cassia Fistula,	C. fistula.	Purging Cassia.	Upper Egypt & India.	Fruit.
	" Marilandica,	C. Marilandica.	Amer. Senna,	U. S.	Leaflets
	Catechu,	Acacia Catechu.	Catechu.	E. Indies,	Ext. fro Wood,
	Copaiba,	Copaifera Multijuga.	Copaiba.	Brazil.	Oleo Re
	Extractum Glycyrrhizae,	G. glabra.	Licorice.	Europe.	
	Glycyrrhiza.	G. glabra.	Licorice Root.	"	Root,
	Haematoxylon,	H. Campechianum.	Log wood.	Jamaca, Tropical Amer.	Heartw
	Kino,	Pterocarpus Marsupium,	Kino,	E. & W. Ind.	Inspissa ed Ju
	Physostigma,	P. venenosum.	Calabar bean.	W. Africa.	Seed.

STITUENTS.	MED. PROP.	DOSE.	OFFICINAL PREPARATIONS.
. . .	Demulcent, and Nutritious .		Decoc.
Gum, . .	Powerful, Cath.	Grs. 1 to 6, .	Pil. Cathart Co.
Cinnamic acid, ...	Stimulating, Expectorant,	Grs. 5 to 20,	Tinct. Benzoin Co. .
oit, Sugar, &c.,	Stimulant, Antispasmodic,	Grs. 10 to 30,	
Camphor, Vol. c., . . .	Aromatic, Diuretic, &c., .	Grs. 5 to 15,	
	Mild Cath. &c.,		
lic acid—Bitter oily matter, .	Cathartic, .	{ Ext. Fld. ʒ 1 to 3, .	Extract.
, Tannin, .	Antispas, Excitant, Emmen.	ʒ 1 to 2, .	
"	Arom., Stim. Carmin, .		Ol. Vol.
"	Arom., Stim.,		Ol. Vol. (Oil used in Sp. Lav. Comp. and Spts., Lavandula.)
"	Tonic, Diuretic,	ʒ ½ to 1. .	
"	Arom., Stim., Carmin., .		Ol, Vol. Spirit. (Oil used in Aqua.)
"	Arom., Stim., Carmin., .		
"	Stim. Carminative, . .		Ol. Vol.
"	Externally, mild Iritant,		
"	Stim, Diaphoretic. . .		Ol. Vol.
"	Stim., Emmenagogue, .		Ol. Vol. (Oil used in Sp. Lav. Comp. Linim. Saponis.)
"	Astring., Arom.,	Grs. 20 to 30,	Infusion.
	Sedative, Tonic, Astringent, .	℈ 1 to 2, .	
, Tannin, .	Stim., Diaphor.,		
	Nervine, Tonic,		
	Stim., Diaphor. Antispasmod.		Aqua, Cer. Plumb. S. Acet.—Liniment. Camph., Liniment. Saponis. Mist. Chloroformi. Spirit Camph., Tr. Opii Camph.
(½ to 1 per ct.) , &c., . .	Arom., Stim. Astring. .		Acid Sulph. Arom., Infus. Catechu Co., Pulv. Arom., Sp. Lav. Co., Syr. Rhei. Arom., Tr. Card. Co., Tr. Catechu, Tr. Cinnam., Wine Opium., Infus. Digitalis.
a, Sipeeria,	Febrifuge, Tonic.	Grs. 2 to 20.	
Oil, (Oxygen- . . .			
ic Aldehyde,	Arom., Stim. .		Aq. Cinnam., Spirit Cinnam.
, Camph. Tan- ., . . .	Stim., Diaphor.,		Decoc. Sarsap. Co., Ext. Sarsap. Co., Oleum.
e, . . .	Mucilaginous,		Mucilago.
. . .	Demulcent, ,		Mist. Amygdala., Mist. Creta., Mist. Glycyrrh. Co., Mucilago., Syrup.
ol. Oil, Cinna- Benzoic Acid,	Stim., Expector.	Grs. 10 to 30,	
innamic Acid, Oil, .	" "	Grs, 10 to 30,	Tr. Benz. Co., Tr. Tolu.
ad mucilage,	Laxative, .	ʒ 1 to 2, .	Confect. Senna.
n, Vol. Oil;&c,	Cathartic .	℈ ½ to 3, .	
—Tannic c., . . .	Astringent, .	Grs. 10 to 30,	Infus. Catechu Co., Tr. Catechu.
l and Resin,	Diuretic, stim. Laxative .	ʒ ¼ to 1, .	Ol. Vol., Pillul.
vic Acid), hizin, Aspara- . . .	Demulcent, .		Mist. Glyc. Co., Pil. Ferri. Iodid., Tr. Aloes., Tr. Rhei et Senna., Troch. Glyc. et Opii, Troch. Cubebæ.
hizin. Aspara- . . .	" .		Decoc. Sarsap. Co., Ext. Fld., Ext. Sarsap. Fld. Co., Inf. Lini. Co., Pil. Hydrarg., Syr. Sarsap. Co.
, Haematoxy- ., . . .	Astringent, .		Decoc., Ext.
nnic Acid, .	" .	Grs. 10 to 30,	Tinctura.
. . .	Spinal depressant, . .	Grs. 2 to 3, .	

NATURAL ORDER.	OFFICINAL NAME.	BOTANICAL NAME.	COMMON NAME.	HABITAT.	PAR
	Santalum.	Pterocarpus santalinus.	Sandal wood.	India.	Wo
	Scoparius.	Sarothamnus Scop.	Broom.	Europe.	Top
	Senna.	Cassia obovata, C. elongata & C. acutifolia.	Senna.	Egypt and shores of Mediterranean, Asia & India.	Lea
	Tamarindus.	Tamarindus Indica.	Tamarinds.	E. & W. Ind.	Fru
	Tragacantha.	Astragalus verus & other species of A.	Gum Dragon.	Levant.	Gu
	Mucuna.	Mucuna pruriens.	Cowhage.	W. Indies.	Hai th
Lichenaceæ,	Cetraria.	Cetraria Islandica.	Iceland Moss.	N. Europe.	Mos
Liliaceæ.	Allium.	A. sativum.	Garlic.	U. S. Cultivated in Eng.	Bul
	Aloe Barbadensis.	Aloe vulgaris.	Barbadoes aloes.	Barbadoes & W. I.	Jui L
	Aloe Capensis.	A. spicata and other species of A.	Cape aloes.	Cape of Good Hope.	Jui L
	Aloe Socotrina.	A. Socotrina.	Socotrine alo's.	Isle of Socotra & neighboring districts.	Jui L
	Scilla.	Scilla maritima.	Squill.	Levant.	Bul
Linaceæ,	Lini Farina.	L. usitatissimum.		British Isles.	Fro
	Linum.	” ”	Flaxseed.	”	See
	Oleum Lini.	” ”		” ”	
Lobeliaceæ,	Lobelia.	Lobelia inflata.	Indian Tobacco	U. S.	Lea T
Loganiaceæ.	Gelsemium.	G. sempervirens.	Yel. Jasmine.	S. U. S.	Roo
	Ignatia.	Strychnos Ignatia.	St. Igna. Bean.	Phillipine Islands.	See
	Nux Vomica.	Strychnos Nux vomica.	Quaker Button	India.	”
	Spigelia.	S. Marilandica.	Pink Root.	U. S.	Rhi
Lycopodiaceæ,	Lycopodium.	L. clavatum & other species of L.		Europe.	Spo
Magnoliaceæ.	Liriodendron.	L. tulipifera.	Tulip Tree Bk.	U. S.	Bar
	Magnolia.	M. acuminata & M. tripetala.	Sweet Magnol.	”	”
Malvaceæ.	Althæa.	A. officinalis.	Marshmallow.	Eu. & U. S.	Roo
	Gossypium.	G. herbaceum & other species of G.	Cotton.	S. U. S.	Fil f
	Gossypii Radicis Cortex.	G. herbaceum & other species of G.	Cotton Rt. Bk.	”	Bar
Marantaceæ,	Canna.	From an undetermined species.	Starch. Tous les Mois.	W. Indies.	Fec R
	Maranta.	Maranta arundinacea.	Arrow Root.	W. Indies, Natal, &c.,	Fec R
Melanthaceæ,	Colchici Radix.	C. autumnale.	Colchicum or Meadow Saffron.	Europe.	Cor
	Colchici Semen.	” ”	Colchicum or Meadow Saffron.	”	See
	Sabadilla.	Veratrum Sabadilla.	Cevadilla.	Mexico.	”

STITUENTS.	MED. PROP.	DOSE.	OFFICINAL PREPARATIONS.
Acid,	Color'g Matter,		Sp. Lavandulæ Co.
n, Spartein,	Diuret. Cath.,	Grs. 10 to 15,	
ic Acid, Yel- loring matter eculiar sugar,	Cathartic,	ʒ 1 to 2,	Confect., Ext. Fl., Syr. Sarsa. Co., Tr. Rhei. et Sennæ.
Acetic, Citric, ric Acids, Pec- c.,	Laxative, Refrigerent,	ʒ 1 to 15,	Confectio. Sennæ.
n & Soluble	Demulcent		Troch. Acidi Tannici, Tro. Ipecac.. Tro. Pot. chlor., Tro. Santon, Tro. zingib.
	Anthelmintic,		
n 70 to 80 per starch devoid icture), Ce- acid & Oxalic	Demulcent, Nutritious Tonic,	ʒ ½ to 1,	Decoc.
l, (Sulphuret-	Stim. Expec'.	ʒ ½ to 2,	Syrup.
, Barbaloin,	Cathartic Emmenagogue,	Grs. 3 to 15,	
Cape aloin,	" "	" "	
Soc aloin,	" "	" "	Pil. Aloes, Pil. Al. et Masticheѕ, Pulv. Aloes et Canellæ, Tr. Al. et Myrrh., Vin Aloes, Tr. Benz. Co.
i. Mucilage, r,	Expect. Diuretic, large dose, Emetic,	Grs. 1 to 2,	Acetum, Syrup., Syr. Scillae Co., Tr. Scillae.
il, Mucilage,	Demulcent Emollient,		Infus. Lini. Comp.
a, Lobelic chlorophyl, &c.,	Emetic Narcotic,	Grs. 5 to 20,	Acetum, Tinctura.
ia & an acid emic acid),	Febrifuge, Diaph. anti-spasmodic,	Gelsemin Grs ¼ to 1,	
ia, 1.5 & Bru- 5 per ct.	Tonic,	Ext. Gr. ¼ to 1,	Extract.
ia, ¼ to ½ per ucia, Igasuria ric acid,	Tonic, Laxative	Grs. 2 to 5,	Strychnia, Tinct., Ext.
tarch Tannin, il, 47 per ct.	Anthelmintic,	ʒ 1 to 2,	Ext. Fl. Infus., Ext. Spigeliæ et Sennæ Fl.
e & neutral ple,	Arom. Stim., Tonic Diaph.,	℈ 1 to ʒ 2,	
e & neutral ple,	Gentle Stim., Arom. Tonic,	ʒ ½ to 1,	
ge, starch, sac- ie matter,	Demulcent,	ʒ ¼ to 1,	
s of cellulose, Wax, a fatty albuminoid ance.			Pyroxylin, Collodium.
ss acrid resin, ies red by ex- e,	Emmenagogue, Parturient,	Ext. Fl. ʒ 1 to 4,	Ext. Fl.
	Nutritious food,		
	Nutritious food,		Troch. Ipecacuanhæ.
in Starch, su- &c.,	Sedative Diuretic,	Grs. 1 to 5.,	Vinum Colch., Ext. Colch. Acet., Ext. Fl.
in Gallic acid, r & fatty oil,	" "		Ext. Fl., Tinct., Vinum.
la, Sabadillia, dillic acid, &c.	Acrid Drastic, Emeto-Cath.,	Grs. 5 to 20,	Veratria.

NATURAL ORDER.	OFFICINAL NAME.	BOTANICAL NAME.	COMMON NAME.	HABITAT.	PART USED
	Veratrum Album.	Veratrum album.	White Hellebore.	Europe.	Rhizome,
	Veratrum Viride.	V. viride.	Am. Hellebore.	N. America.	Rhizome,
Meliaceæ.	Azedarach.	Melia Azedarach.	Pride of India,	Persia, Syria, S. U. S.,	Bark,
Menispermaceæ.	Calumba.	Jateorrhiza palmata, Cocculus palmatus and J. Columba, by different authorities.	Columbo.	Africa.	Root,
	Pareira.	Chondodenron Tomentosum. (False Pareira. Cissampelos Pareira.)	Pareira Brava.	S. Amer. and W. Indies.	
Myristiceæ.	Macis.	Myristica fragrans.	Mace.	E. Indies.	Arillus of fruit,
	Myristica.	Myristica fragrans.	Nutmeg.	E. Indies. Malayan Archipelago.	Kernel of fruit,
	Oleum Myristicae.	" "		E. Ind. Malayan Archipelago,	Vol. Oil,
Myrtaceæ.	Caryophyllus.	C. aromaticus.	Cloves.	Islands of E. Indies.	Unexp ed flo
	Granati Fructus Cortex.	Punica Granatum.	Pomegranate rind.	S. Europe.	Rind,
	Granati Radicis Cortex.	" "	Pomegranate Bark.	" "	Bark,
	Oleum Cajuputi.	Melaleuca Cajuputi.		Islands of E. Indies.	
	Pimenta.	Eugenia Pimenta.	Allspice.	W. Indies.	Unripe Berrie
Oleaceæ.	Manna.	Fraxinus Ornus & F. rotundifolia.	Manna.	Sicily.	Exuda
	Oleum Olivae.	Olea Europæa.	Sweet Oil.	S. Europe.	Fixed
Orchidaceæ.	Vanilla.	Vanilla Aromatica.	Vanilla Bean.	Mexico.	Unripe fruit,
	Cypripedium.	C. pubescens, and C. parviflorum.	Lady Slipper.	U. States.	Rhizom
Palmaceæ.	Sago.	Sagus, Rumphii.	Sago.	East Indies.	Prepared fecula pith,
Papaveraceæ.	Opium.	Papaver Somniferum.	Opium.	Asia Minor.	Concrete juice unripe capsul
	Papaver.	" "	Poppy.	Asia Minor.	Capsul
	Sanguinaria.	S. Canadensis.	Blood root.	U. States.	Rhizom
Phytolaccaceæ.	Phytolaccae Bacca.	P. decandra.	Poke Berry.	U. States.	Fruit,
	Phytolaccae Radix.	" "	Poke Root.	U. States.	Root,
Piperaceæ.	Cubeba.	Piper Cubeba, Cubeba officinalis.	Cubeb.	E. Ind., (Java, Penang)	Unripe fruit,
	Matico.	Artanthe elongata.	Matico.	Peru.	Leaves.
	Piper.	P. Nigrum.	Pepper, (Blk.),	Java, &c.,	Unripe berries,
Plumbaginaceæ.	Statice.	S. Limonium, var. Caroliniana.	Marsh Rosemary.	U. States.	Root,
Polygalaceæ.	Senega.	Polygala Senega.	Senega Snake Root.	U. States.	Root,

CONSTITUENTS.	MED. PROP.	DOSE.	OFFICINAL PREPARATIONS.
acid, Pectic mat- r, Jervia. Verat marin (Weppen),	Violent Emetic & Cathartic,	Gr. 1, increasing, .	
via, Veratridia, &c.	Emetic.Expect. Diaphoretic,	Grs. 1 to 4,	Ext. Fl., Tinctura.
berina, Calumbic oid, . . .	Cath., Emet., Anthelmin.,		
rch, Pectin, Gum, Tannin, .	Tonic, . .	Grs. 10 to 30,	Ext. Fld., Tinctura, Infus.
berina, Buxine,&c.	Tonic, Aperient Diuretic, .	Grs. 30 to 60,	Infus., Ext. Fld.
Oil, Resin, sugar, acilage, &c., .			
("Butter") about per ct. Vol. Oil, per cent Starch,&c.	Arom.,astring , stomachic, .	Grs. 5 to 20,	Acetum Opii, Pulv. Aromat., Sp. Lavandula Comp., Syr. Rhei Arom., Troch. Cretae., Troch Magnes., Troch. Sodii Bicarb.
			Sp. Ammoniæ, Arom.
Oil, 16 to 18 per nt (which consists light & heavy oil) genin, Caryophy- and a kind of nnic acid, . unds in Tannin, .	Arom.. Stim., Iritant, .	Grs. 5 to 10,	Sp. Lavandulæ Comp., Syr. Rhei Arom., Vin. Opii.
nin, Gallic Acid, Sugar & Punicin,	Anthelmintic, astringent, .	Ext.Fl.. ½ to ʒ 1, . .	
Oil, Tannin, arch, ...	Arom., Stim.,	Grs. 10 to 40,	
nite, Brown red sin & Fraxin, .	Laxative, .	ʒ ½ to 8, .	
n, Palmintin,Ara- ic acid, . .	Laxative, Nutritious. .	Fl. ℥ 1 to 2,	
illin & Vanillic id, ...	Aromat., Stimulant, . .		Troch. Ferri Sub. Carb., Troch., Potass. Chlor.
oil, acid, Tannin,	Tonic, Stimulant, Antispasmodic,	Grs. 10 to 20,	
ch, . . .	Nutritive, .		
onic acid, Morphia odeia, Narceina, culiar Gum, &c.,	Stim.,Narcotic, Sedative, .	Gr. ¼ to 1,	Tinct., Tr. Opii Camph., Tr. Opii decd., Troch. Glycyrrh et Opii, Vin. Opii., Acetum, Confect. Ext. Morphia, Pil. Opii, Pil. Saponis Co., Pulv. Ipecac. Co.
te as Opium, but uch weaker, .	FeebleNarcot.,		
guinarina, and an id, ... charine matter, .	Acrid, Emetic, Expectorant,	Grs. 1 to 5,	Acetum, Tinctura.
nic Acid, Starch, um, &c., . .	Emetic & Purgative. .	Grs. 1 to 5,	
ebin, Vol. Oil, Re- n, ...	Gentle Stimulant, Diuret., Expectorant.	ʒ 1 to 3,	Oleo Resin, Ol. Vol., Tinctura.
in, Artanthic Acid, ol. Oil, . . .	Arom., Tonic, Stim., Diuretic, . .	ʒ ¼ to 2,	Ext. Fld.
erin, Vol. Oil; Re- n, . . .	Stimulant,Carminative, .	Grs. 3 to 15,	Oleo Resin.
nin. Gum, &c., .	Astringent, .	Grs.10 to 15,	
egin, Polygalic cid, &c., . .	Stimulating. Emetic. Expectorant,&c,	Grs. 10 to 30,	Decoct.. Extract.. Syr. Scillæ Co.. Syrup Senegæ.

NATURAL ORDER.	OFFICINAL NAME.	BOTANICAL NAME.	COMMON NAME.	HABITAT.	PART US
	Polygala Rubella,	Polygala Rubella.	Bitter Polygalla, . .	U. States, .	Rt. & He
	Krameria, . .	K. triandria, . ,	Rhatany, .	Peru, . .	Root,
Polygonaceæ,	Rheum, . . .	R. palmatum and other species of R.	Rhubarb, .	China, Chinese, Tartary & Thibet,	Root,
	Rumex, . .	R. crispus. . .	Yellow Dock,	Eur. & U. S.	Root,
Pyrolaceæ, [Sub-ord of Ericaceæ.]	Chimaphila, .	C. umbellata, . .	Pipsissewa, .	U. States, .	Leaves,
Ranunculaceæ,	Aconiti Folia, .	Aconitum Napellus,	Aconite, Monks-hood, . .	Germany or Britain, .	Leaves,
	Aconiti Radix, .	" " .	"	" "	Tuber,
	Cimicifuga, . .	C. racemosa, . .	Black Snake root—Cohosh,	U. States, .	Rhizome,
	Coptis, . . .	C. trifolia, . .	Gold thread. .	N. America,	Herb,
	Helleborus, . .	H. niger, . . .	Blk. Hellebore,	Cent. Europe,	Rhizome,
	Hydrastis, . .	H. Canadensis, .	Golden Seal, Yellow Root,	U. States, .	Rhizome,
	Delphinium, .	D. Consolida, . .	Larkspur,	Eur. & U. S.	Seed,
	Hepatica, . .	H. Americana, .	Liverwort, .	U. States, .	Leaves.
	Ranunculus, .	R. Bulbosus, . .	Crowfoot .	U. States, .	Corm and Herb,
	Xanthorrhiza, .	X. apiifolia, . .	Yellow Root.	U. States. .	Rhizome,
Rosaceæ,	Amygdala Amara,	Amygdalus communis, var, amara, .	Bitter Almond,	Persia, Syria & Barbary.	Kernel Fruit,
	Amygdala Dulcis,	Amygdalus communis, var. dulcis, .	Sweet Almond,	Cultiv. in So. Europe,	" "
	Oleum Amygdalæ Amarae, . .	" "	Oil Bitter Almonds. . .		Vol. Oil.
	Oleum Amygdalæ Expressum, .	" "	Oil Sweet Almonds, . .		Fixed oil,
	Oleum Rosæ, .	Rosa Damascena, .	Oil of Rose, .		
	Prunum, . .	Prunus domestica, .	Prunes, . .	Europe. .	Fruit,
	Prunus Virginiana, . . .	Cerasus serotina, .	Wild Cherry Bark, . .	U. States, .	Bark,
	Rosa Centifolia, .	R. Cent., . . .	Pale, (cabbage) Rose, . .	All over the World, .	Petals,
	Rosa Gallica, .	R. Gall., . . .	Red Rose, .	So. Eu., U.S.,	Petals,
	Rubus, . . .	Rubus Canadensis and R. Villosus, .	Blackberry Root, . .	U. States, .	Bark of Root,
	Brayera, . .	B. anthelmintica, .	Kousso. . .	Abyssinia, .	Flowers and Fr
	Cydonium, . .	C. Vulgaris, . .	Quince seed, .	Austria—cult in U. S., .	Seed,
	Geum, . . .	G. rivale, . . .	Water Avens,	U. States, .	Rhizome
	Gillenia, . .	G. trifoliata, stipulacea, . . .	Indian Physic, American Ipecac, . .	U. States, .	Root,
	Spiraea, . .	S. tomentosa. . .	Hardhack Meadow Sweet, .	U. States, .	Root,
	Tormentilla, .	Potentilla Tormentilla, . . .	Tormentil. .	U. States, .	Rhizome,
Rubiaceæ,	Ipecacuanha, .	Cephaelis Ipecacuanha, . . .	Ipecac, . .	Brazil, . .	Root,

CONSTITUENTS.	MED. PROP.	DOSE.	OFFICINAL PREPARATIONS.
[illegible]	Tonic, Laxative, Diaphoretic, . .	Grs. 10 to 30,	
Varieties of Tannic Acid, and a principle analogons to Tyrosine, ...	Astringent, .	Grs. 10 to 30,	Extract, Ext.Fld.. Infus, Syr., Tinct.
Chrysophanic Acid, &c., 3 coloring matters, and Ox. Calcium, . . .	Cathartic. Tonic, . .	Grs. 10 to 30,	Pulv. Rhei Co., Syr. Rhei Arom., Tinct., Tr. Rhei et Sennæ., Vinum Extract, Ext. Alc., Ext. Fld.. Infusion, Pil. Rhei Co., Pil. Rhei.
Chrysophanic Acid & varieties of Tannin.	Tonic., Astringent, Alterative, . .		
Chimaphilin, Chlorophyl, &c.. . . .	Diuretic, Astringent, .	ʒ ¼ to 1,	Decoct.
Aconitia, Aconitic acid, Napellina, . .	Narcotie, Sedative, . .	Grs. 1 to 2,	Extract.
Aconitia, A. Acid, Aconella Fixed Oil, .	"	Grs. ½ to 2,	Aconitia, Emplast., Liniment., Tinct. Aconit. Rad.
Alkaloid, Vol. Oil and Tannin, . . .	Tonic, Diuretic,	Grs. 10 to 20,	Ext. Fld.
Berberina, . . .	Tonic, (Bitter),	Grs. 10 to 30,	
Helleborin and Organic Acid, . . .	Drastic, Cathartic, Emmenagogue, .	Grs. 2 to 10,	Extract., Tinctura.
Berberina Hydrastia,	Ton., Aperient, Alterative,	Grs. 10 to 30,	
Delphinia, Delphinic Acid. Gallic and Malic Acid, . . .	Diuretic. Emmen., Vermifuge, . .		
Tannin, . . .	Mild, Demulcent, Tonic, and Astringent, . .	Ext. Fld., 1 to 2 Fl. ʒ,	
Anemonin, Anemonic Acid. . . .	Externally Vesicant, .		
Berberina, . . .	Tonic. . .	℈ 2, . .	
Fixed Oil, Amygdalin and Emulsin, yielding Hydrocyanic Acid. . . .	Sedative, .		Syrup.
Emulsin and large pr. cent. of Fixed Oil, .	Nutrient, Demulcent, .		Mistura, Syrup.
	Similar to Hydrocyanic Acid, . .	Gtt ¼ to 1,	Aquæ.
			Ung. Aquæ Rosæ.
Sugar. Malic Acid and Pectin. . . .	Laxative, Nutritious, .		Confect. Sennæ.
Amygdalin and Emulsin, producing Hydrocyanic Acid--Tannin, ...	Ton., Sedative,	Grs. 20 to 60,	Ext. Fld., Infus., Syrup.
Vol. Oil, Quercitrin Sugar, . . .	Slightly laxative, . .		Aq. Rosæ. Syr. Sarsap. Comp.
" "	Slightly astringent. . .		Confect. Rosæ, Infus. Rosæ Comp., Mel. Rosæ, Pil. Aloes et Mastiches, Syrup.
Tannin, . . .	Astringent, Tonic, . .	Grs. 10 t0 30,	Ext. Fld., Syrup.
Tannin, Koussin, Bitter Resin, . .	Purgative, Anthelmintic, .	ʒ 1 to 2,	
Mucilage, . . .	Demulcent, .		
Gein (Tannin), .	Astringent, Tonic, . .	Grs. 10 to 40,	
Tannin, Gum, Resin,	Emetic, . .	Grs. 10 to 30,	
Tannic and Gallic Acid. . . .	Tonic, Astringent, . .		
Tannin, . . .	Astringent, .	Grs. 20 to 60,	
Emetia, Ipecacuanic Acid, . . .	Emetic, Expec. Diaphoretic,	Emet, Grs. 20 Diaph. Grs. ½ to 2. .	Ext. Fld., Pulv. Ip. Comp., Troch. Ipecac., Troch. Morph. et Ipecac., Vinum.

NATURAL ORDER.	OFFICINAL NAME.	BOTANICAL NAME.	COMMON NAME.	HABITAT.	PART USED
	Rubia,	R. tinctorum,	Madder,	So. Europe,	Root,
Rutaceæ,	Angustura,	Gallipea officinalis,	Angustura,		Bark,
	Buchu,	Barosma crenata and other species of B.,	Buchu,	Cape of Good Hope,	Leaves,
	Ruta,	R. Graveolens, ;	Rue,	So. Europe,	Leaves,
Salicaceæ,	Salix,	S. alba,	Willow,	Europe and N. Amer.,	Bark,
Sapotaceæ,	Gutta-percha,	Isonandra gutta,		E. Indies,	Concrete Juice,
Saxifragaceæ,	Heuchera,	H. Americana,	Alum Root,	U. States,	Rhizome,
Scrophulariaceæ,	Digitalis,	D. purpurea,	Foxglove,	Europe,	Leaves,
	Leptandra,	L. Virginica,	Culver's Root,	U. States,	Rhizome,
Sesameæ,	Olium Sesami,	Sesamum Indicum and S. Orientale,	Oil of Benne,		Fixed oil of Seed,
	Sesamum,	Sesamum Indicum & S. Orientale,	Benne leaf,		Leaves,
Simarubaceæ,	Quassia,	Simaruba Excelsa,	Quassia,	Jamaica,	Wood,
	Simaruba,	S. Officinalis,	Simaruba,		Bark of Root,
Smilaceæ,	Sarsaparilla,	Smilax Officinalis & other species of S.	Sarsaparilla,	Honduras, Jamaica, Central America,	Root,
Solanaceæ,	Belladonnæ Folia.	Atropa Belladonna,	Deadly Nightshade,	Britain, Germany,	Leaves,
	do Radix,	“ “	“ “	“ “	Root,
	Capsicum,	C. annuum, C. fastigiatum,	Cayenne Pepper,	Zanzibar,	Fruit,
	Dulcamara,	Solanum dulcamara.	Bitter Sweet,	Europe & U. States,	Young Branch
	Hyoscyami Folia,	H. Niger,	Hen-bane,	Britain,	Leaves,
	do Semen.	“ “	“	“	Seed,
	Tabacum,	Nicotiana Tabacum,	Tobacco,	U. S.,	Dried Leaves,
	Stramonii Folia,	Datura Stramonium,	Thorn Apple, Jamestown weed,	Britain,	Leaves,
	do Semen,	“ “	“ “	“	Seed,
Sterculiaceæ,	Oleum Theobromæ,	T. Cacao,	Cocoa Butter,	South America, W. Ind.	Solid Balsam,
Styraceæ,	Benzonium,	Styrax Benzoin,	Benzoin,	Siam, Sumatra,	
Terebintaceæ or Xanthoxylaceæ,	Xanthoxylum.	Xanthoxylum fraxineum and X. Carolinianum,	Prickly Ash,	U. S.,	Bark,
Thymelaceæ,	Mezereum.	Daphne Mezereum, and D. Gnidium,	Mezereon,	Europe,	Bark,
Ulmaceæ,	Ulmus,	Ulmus fulva,	Elm Bark,	Britain,	Bark,
Umbelliferæ,	Ammoniacum,	Dorema Ammoniacum,	Gum Ammoniac,	Persia,	Gum Resin,
	Anisum,	Pimpinella, Anisum,	Aniseed,	Europe and China,	Fruit,
	Assafœtida,	Narthex Assafœtida,	Assafœtida,	Afghanistan,	Gum Resin,
	Carum,	Carum Carui,	Caraway,	England and Germany,	Fruit.
	Conii Folia,	Conium Maculatum,	Hemlock,	Britain,	Leaves,

NSTITUENTS.	MED. PROP.	DOSE.	OFFICINAL PREPARATIONS.
distinct Color- matters. Princi- one Alazarin,	Diuretic. Emmenagogue,	Grs. 10 te 30.	
il, Cusparin, .	Stimul.. Tonic, Cathartic, .	Grs. 20 to 30,	Infusion.
il. Mucilage. .	Diuretic, Stim..	Grs. 20 to 30,	Ext. Fld. Infusion.
il, . - .	Stimul.. Antispasmodic, Emmen, .	Grs. 10 to 20,	Ol. Vol.
n.,Coloring mat- Tannin, . .	Tonic. Astrin., Antiperiodic,	Grs. 10 to 60.	Salicin.
			Liquor G. Percha.
n, . . .	Astringent. .		
lin, Digitalic l, . . .	Diurecic, Narcetic, Sedative, . .	Gr. ½ to 1,	Infusion., Ext., Ext. Fld., Tinct,
ndrin, . .	Laxative.	Grs. 10 to 30.	
Oil, &c., .	Employed as is Olive Oil, Demulcent, .		
in, 1-10 per ct.,	Sim. Bit. Tonic,	℈ 1 to ʒ 1, .	Extract. Infusion, Tinct.
"	Tonic, . .	℈ 1 to ʒ 1, .	
in, . . .	Altera..Diuret..	ʒ 1 to 2, .	Decoct. Comp., Ext. Fld., Ext. Fld. Comp., Syr. Sarsap. Co.
a, (.44 per cent.) ragin, . .	Narcotic,. .	Grs. ½ to 2,	Ext., Ext. Alc., Tinct.
a and Bella- , . . .	"	Grs. ½ to 2.	Atropia, Emplastrum, Ext. Fld.
in, Vol. Oil and , . . .	Powerful Stim- Rubefacient,	Grs. 3 to 10,	Infus., Oleo. Resin., Tinct.
a. (1-10 per ct..) Dulcamarina,.	Externally Employed, .		Decoct., Ext., Ext. Fld.
amia,(Volatile loid), . .	Narcotic, .	Grs. 2 to 8,	Extract., Ext. Alcoholic, Ext. Fld., Tinct.
amia and fixed	"	" "	
ina, 2 per cent., Alk.), Vol.Oil, ious inorganic ituents. . .	Narcotic, Sedative, . .	Grs. 5 to 6,	Infusion., Oleum, Ung., Vinum.
of Daturia,1-10 ent., . . .	Narcotic, .	Grs. 1 to 3,	Ext.
Dat., Fixed Oil.	"	Grs. ½ to 1,	Ext. Tinct.
, Oleic Acid, atine, &c. obromine from s,) . . .	Chiefly in Suppositoris, .		Suppositor. Acid Carbolic, Acid Tannic. Aloes, Assafœtida, Belladon., Morphia, Opii, Plumbi, and Plumbi et Opii.
c Acid, 12 per innamic Acid,	Stimu., Expectorant, . .	Grs. 10 to 30,	Benzoic Acid, Tr. Comp., Tr., Oint.
oxylin, Xantho- e, ident. with erina, . .	Stim., Alterative, Sialagogue, .	Grs. 10 to 30,	
in, . . .	Stim., Alterative, Diuretic,	Grs. 5 to 10,	Decoct. Sarsaparilla, Comp. Ext. Fld., Ext. Sarsap. Fld. Co.
ge, . . .	Demulcent, feebly astringent,		Mucilago.
l, 1⅛ pr. ct. Re- 0 per ct. Gum, r cent., . .	Stim., Expectorant, . .	Grs. 10 to 30,	Emplas., Mistura, Pil. Scillæ Comp., Emp., Ammoniaci Cum. Hydrargaro.
l, (2 per cent.,)	Arom., Carminative, .	Grs. 20 to 30.	Ol. Vol.
il, 4 per cent., , 45 per cent., , 25, Ferulic . . .	Stim.. Antispasmodic, .	Grs. 10,	Emplast., Mistura, Pil. Aloe. et Assafœt., Pil. Assafœt., Pil. Galbani Comp., Suppositoria, Tinctura.
l, 4 per ct.; .	Stomachic, Carminative, .	℈ 1 to 3, .	Ol. Vol., Tr. Card. Comp.
-10.000 per ct.,	Narcotic, Sedative, . .	Grs. 1 to 4,	Ext. Alc., Ext., Juice., Tinct.

NATURAL ORDER.	OFFICINAL NAME.	BOTANICAL NAME.	COMMON NAME.	HABITAT.	PART USED
	Conii Fructus.	Conium Maculatum,	Hemlock,	Britain,	Fruit,
	Coriandrum.	C. Sativum.	Coriander seed,	Britain,	Fruit,
	Fœniculum.	F. Dulce	Fennel,	Malta,	Fruit,
	Galbanum.	Ferula erubescens,	Galbanum,	India, Levant	Gum Resin,
	Carota.	Daucus Carota.	Carrot,	U. S.,	Fruit,
	Petroselinum,	P. Sativum,	Parsley,	U. S.,	Root,
Urticaceæ.	Ficus,	F. Carica,	Fig,	Smyrna.	Fruit,
	Humulus.	H. Lupulus,	Hops,	U. S.,	Strobiles,
	Lupulina.	" "	Lupulin,	U. S.,	Yellow powder from Strobiles.
Valerianaceæ,	Valeriana,	V. Officinalis.	Valerian,	Britain,	Rhizome,
Violaceæ,	Viola.	V. pedata.	Blue Violet,	U. S.,	Root.
Vitaceæ.	Uva Passa.	Vitis Vinifera.	Raisins,	Germany,	Dried Fruit
Zingiberaceæ,	Cardamomum.	Eletharia Cardamomum,	Cardamom,	U. S.,	Fruit,
	Zingiber.	Zing. Officinale,	Ginger,	Malabar,	Rhizome,
	Curcuma.	Curcuma Longa,	Turmeric,	W. Indies & India,	Rhizome,
Zygophyllaceæ,	Guaiaci Lignum.	G. Officinale.	Lignum Vitæ,	St. Domingo, Jamaica,	Wood,
	do Resina.	" "	Gum Guaiac,	" "	

CONSTITUENTS.	MED. PROP.	DOSE.	OFFICINAL PREPARATIONS.
Conia, 1-10,000 per ct.,	Narcotic, Sedative, . .	Grs. 1 to 2,	Ext. Fld.
Vol. Oil, ½ per ct. .	Aromat., Carminative, .	℈ 1 to 3, .	Confec. Sennæ. Inf. Gent. Co.. Infus. Sennæ.. Tr. Rhei et Sennæ.
Vol. Oil, 3 per ct., .	" "	℈ ½ to 2, .	Ol. Vol., Tr. Rhei et Sennæ.
Vol. Oil, 5 per cent.. Gum. 20 per ct., Resin, 60 per ct., . .	Stim., Expect., Anti-spasmodic, . .	Grs. 10 to 20,	Emplas. Assafœt., Emp.. Galban. Co., Pil. Galban. Co.
Vol. Oil, 20 per cent.,	Aromatic, Excitant . .	Grs. 30 to 60,	
Vol Oil and Apiol,	Aperient, Diuretic, . .		
Grape Sugar, 60 to 70 per cent., . . .	Nutritious, Laxative and Demulcent, .		Confect., Sennæ.
Tannin, Vol Oil, (Valerol) Wax, . .	Tonic, Anodyne,	Grs. 3 to 20,	Infus. Tinctura.
Vol. Oil. Resin, Wax, and Bitter Acid, .	Tonic, Anodyne, Narcotic, .	Grs. 6 to 12,	Ext. Fld., Oleo Resin. Tinctura.
Valerol, ½ to 2 pr.ct.. changing to Val. Acid, and a Camphor. Malic Acid, .	Antispasmodic, Stimulant, .	Grs. 30 to 60,	Ext., Ext. Fld., Infus., Oil, Tinctura. Tr Ammoniat.
Violia, 4½ per ct. Vol. Oil, 10 per ct. Fixed Oil.	Laxative, Antisyphilitic, Emolient. .	Grs. 10 to 20,	
Glucose, . . .	Gently Laxative, . .		Tr. Rhei et Sennæ.
Vol. Oil & Acrid Resin,	Tonic, Aromatic	Grs. 5 to 20,	Ext. Colocynth, Comp. Aromatic powder, Tinct., Tr. Card. Co., Tr.. Gent. Co.. Tr. Rhei. Vin. Aloes.
" " "	Carminative, Stimulant, .	Grs. 10 to 20,	Acid Sulph., Arom., Ext. Fl., Oleo Resin, Pil. Scillae Co., Pulv, Aromat., Pulv. Rhei Co., Tinct., Vin. Aloes.
1 per ct. Vol. Oil and Curcumin, . .	Stimulant, Aromatic, Coloring, . .	Grs. 5 to 30,	
Resin, 25 per cent., .	Alterative, Stimulant, .		Decoc. Sarsap. Co., Syr. Sarsap. Co.
Guaiaconic Acid, Guaiaretic Acid, Guaiacic Acid, . . .	" "	Grs. 10 to 30,	Pil. Antimonii Co., Tinct., Tr. Ammoniat.

GEOGRAPHICAL GROUPING

OF

MATERIA MEDICA.

EUROPE.

NORTHERN EUROPE	Cetraria, Terebinthina, Resina, Pix.
Russia	Santonica, Sumbul.
Great Britain (*indigenous or cultivated*)	Aconitum, Anethum, Anisum, Anthemis, Belladonna, Conium, Coriandrum, Digitalis, Dulcamara, Filix-mas, Glycyrrhiza, Hordeum, Hyoscyamus, Juniperus, Lactuca, Lavandula, Linum, Mezereum, Papaver, Rhamnus, Rosa, (*R. centifolia* and *R. gallica*, cultivated), Rosmarina, Ruta, Sabina, Sambucus, Scoparius, Sinapis, (*alba* and *nigra*,) Stramonium, Ulmus, Uva Ursi, Valeriana.
CENTRAL EUROPE	Arnica, Ergota, Gentian, Veratrum alb.
Switzerland,	Pix Burgundica.
Hungary, &c.	Cantharis.
SOUTH EUROPE.	
Shores of Meditterranean	Aurantium, Amygdala (*A. dulcis*), Colocynthis, Crocus, Fœniculum, Granatum, Laurocerasus, Prunus, Scilla.
Sicily and Calabria	Manna.

ASIA.

WESTERN ASIA.

Scio (island)	Mastiche.
Levant	Ficus, Pyrethum, Styrax.
Asia Minor	Acacia, Opium, Scammonium, Tragacanth.
Arabia	Myrrha.
Socotra (island)	Aloe.

CENTRAL ASIA.

Persia and N. E. India	Ammoniacum, Assafœtida, Galbanum.
Thibet and Tartary	Rheum, Moschus.
China	Camphora, Illicium (*I. anisatum*).

SOUTHERN ASIA.

India	Cannabis indicà, Nux vomica, Croton-Tiglium, Ricinus, Zingiber.
North India	Chiretta.
South India	Senna (*cultivated*).
Malabar Coast	Cardamum, Kino.
Ceylon	Cinnamomum.
Siam	Gambogia, Benzoin.
East India Islands	Caryophyllum, Cassia (*C. fistula*), Cubeba, Myristica, Piper nigrum.
Singapore, &c.	Catechu Cajuputi.
Manilla (Philippine Islands)	Elemi.
Sumatra	Benzoin.

AFRICA.

NORTH AFRICA.

Egypt, &c.	Senna.
Mogadore	Amygdala (*A. amara*).
WEST COAST.	Calumba, Physostigma.

EAST AFRICA.

Abyssinia.	Koosso.
Zanzibar,	Capsicum.

SOUTH AFRICA.

Cape of Good Hope	Buchu, Aloes.

AMERICA.

NORTH AMERICA	
Hudson's Bay Territory,	Castoreum.
Canada	Terebinthina Canadensis, Podophyllum.
United States	Veratrum viride, Lobelia, Senega, Sassafras, &c.
Southern States	Gossypium, Serpentaria, Tabacum.
CENTRAL AMERICA	Sarsaparilla (*imported from Jamaica*).
Salvador	Balsam. peruvianum.
Mexico	Jalapa, Sabadilla, Coccus.
Honduras and Jamaica	Sarsaparilla, Haematoxylon.
SOUTH AMERICA.	
New Granada	Balsamum tolutatum.
Guiana	Nectandra.
Peru,	Krameria, Matico.
North-Eastern Districts.	Cinchona (*C. flava, C. rubra, C. pallida.*)
Brazil	Copaiba, Ipecacuanha, Pareira.
Tropical Districts	Theobroma, (*T. Cacao*).
WEST INDIES	Guaiacum, Canella alb., Saccharum, Zingiber, Tamarindus.
Jamaica	Quassia, Pimenta.
Barbadoes	Aloe.
Bahamas	Cascarilla.
PACIFIC AND INDIAN OCEANS	Cetaceum.
ATLANTIC OCEAN AND NORTH SEA (Europe).	Morrhua.

STRUCTURAL BOTANY.

THE CELL.

The simplest form of vegetable life and the most elementary phase from which all others are developed is that of the minute vesicle or cell.

Cells are very small transparent bladders or cysts, with walls or boundaries of cellulose, and generally contain fluids—an egg may be accepted as an illustration of a cell, of which the shell represents the cell-wall. The normal form of the cell is that of a sphere or spheroid, having a length not much exceeding its breadth.

An aggregation of these cells or vesicles constitutes the cellular tissue of plants.

CELL MODIFICATION.

Were the cell walls to retain their original form when compacted together, there would be numerous spaces left unoccupied between points of attachment; these might be termed *intercellular spaces.*

Slight pressure causes the cells to accommodate themselves to the space they have to occupy, and they assume that form which shall best fill up the interstices and occupy the least room—namely, a modification of the dodecahedral with an hexagonal section; hence this is the most common form in the cellular portions of plants.

TISSUES.

PARENCHYMA (Gr. for the substance of the lungs, liver, &c.,) is the name generally given to cellular tissue, which exhibits hexagonal cells when cut across. In fact it is the distinctive name for all ordinary membranous cellular tissues in general. As all forms of tissue are derived from the simple cell, of which they are but subsequent modifications—intermediate forms are met with of all the varieties, and the line of demarcation can scarcely be fixed—therefore the terms cellular and vascular tissues are employed with limitation of meaning and value attached to them; adjectives are employed which seem to mark phases of the same tissue.

The simplest plants (Algæ and Fungi) consist entirely of Parenchyma. The pith of trees and rushes are cellular, as are also all plants in their earliest stages.

VASCULAR TISSUE.

Under the general name of vascular is included the form of tissue, which, with greater propriety, is termed *woody* tissue—*Pleurenchyma or Prosenchyma.*

WOODY TISSUE consists of elongated tubes of a fusiform or spindle-shape, tapering at each end. It is cylindrical, long, fine and tough—characteristics which distinguish it from cellular tissue. It is found in the wood inner bark (bast) and veins of leaves. The walls of this kind of tissue become thickened by successive layers of lignine, and when cut in section the concentric lines or markings of the successive deposits may often be traced.

BAST (*or woody tissue of the liber*) consists of or contains much longer, very thick sided and tougher, but more flexible cells than those of the *wood* itself—their position demands such qualities, being situated near the circumference of stems and branches where expansion is indispensable. The strength of this kind of tissue renders it extremely valuable in the arts—divested of extraneous matter it furnishes hemp, flax, china grass, &c. The distinct forms of woody tissue in linen, and cellular tissue in cotton, are easily detected under the microscope.

GLANDULAR WOODY TISSUE is a peculiar variety of disk-bearing *prosenchyma*, occuring in coniferous and some few other plants; the sides of the tubes are furnished with disks, sometimes in single, and at others, in double or triple rows. These disks or depressions have small orifices in their centre.

FIBRO-VASCULAR TISSUE consists of thin cylindrical tubes, with fibre spirally coiled up within them; it has also been called Trachenchyma (trachea Lat. windpipe). Spiral vessels are the type of this kind of tissue. These vessels which are fusiform (spindle shape) overlap at the ends, where, the intervening membrane being absorbed, they communicate freely with each other. They are found in the medullary sheath, veins of leaves, &c.

When the fibre occurs in rings, it is called *annular*. When the tubes are prismatic, the fibre broken and arranged at equal distances above each other like the steps of a ladder, it is termed *Scalariform* (scalae Lat. a ladder, as in ferns). Sometimes the arrangement is very irregular, branching, making a complete net work; the branches, however, unite and run into each other in a very irregular manner, forming tubular ducts, which seem to convey fluids, called Laticiferous vessels or Cienchyma (kines Gr. I move). The walls are not marked. It commonly occurs in exogens, found in many sorts of *cinchona*, scattered through the tissue intervening between the middle cortical layer (mesophlœum) and the liber. The fluid conveyed (called *latex*) is either colored or transparent. It has of late been suspected to be of a formative character.

SYNOPSIS.

- **Cellular.**
  - Vesicles or Cells.
  - Parenchyma.
- **Vascular.**
  - Woody tissue.
  - Glandular—Disk-bearing.
  - Fibro-vascular.
    - Spiral Vessels.
    - Ducts.
    - Annular Vessels.
    - Scalariform.
  - Laticiferous.

CELL DEVELOPMENT.

The origin of cells has been referred to the formation of a central point amongst the formative fluid, around which a congregation of atoms take place till a firm layer is formed, this becomes ultimately the cell-wall, which enlarges, assimilates fluids and becomes a cell, containing within it the nucleus, or, as it is termed, cytoblast. (katos, Gr. a cell, blastis, a germ.) In growing, the walls of young cells enlarge much faster than the nucleus; the latter soon ceases to grow and is left in the centre or remains adherent to the wall on one side, or more commonly it dissolves and disappears. In older cells the liquid contents and the protoplasmic lining also disappear, and only walls of cellulose remain as the permanent vegetable fabric.

Cell Multiplication.—A living cell formed in whatever manner, has the power of multiplying itself by dividing into two; then again into two more, and so on.

Vegetable growth consists, first, of the growth or expansion of each cell up to its full size, which, ordinarily, is very soon attained; second, of what is called their merismatic multiplication, namely: the successive division of cells into two. This takes place only when they are young and active, and mostly before they are full grown. It is effected by the formation of a partition across the cavity of the cell, dividing it into two. In this way a single cell gives rise to a row of connected cells, when the division takes place in one direction only; or to a plane or solid mass of such cells, when it takes place in two or more directions, thus producing a tissue.

In this multiplication of cells by division, as in the original formation of a cell, the contents and the protoplasmic lining play the most important part. The nucleus, when present, as it commonly is, first divides into two, then the lining membrane or primordial utricle, is gradually constricted or infolded at the line of division, which, soon meeting in the centre, separates the whole contents into two parts by a delicate partition, upon this a layer of cellulose is deposited as a permanent wall, which completes the transformation of one cell into two.

New cells may be formed from old cells by fissuration or internal division, a division or septum separates the old cell into two partitions, each of which becomes a complete cell. New cells are also produced on the outside of old ones as branches. This process has been termed gemmation or budding. This fact has been proved in the growth of sea weeds.

CONTENTS OF CELLS are—

The *primordial utricle* and *protoplasm*, the former being the deposited lining of the cell-wall.

Deposits of *sclerogen* (to make hard) in layers, giving great solidity to some cells. (ex. vegetable ivory.)

Water, generally containing other matters in solution.

Jelly, which is, perhaps, the same as *pectin*, the mucilage which abounds in some algæ.

Starch—*Chlorophyll*, the green, coloring matter.

Chromule, coloring matter other than green, (*wax*, *oil*, *camphor*, *resin* and *raphides*. The presence of the latter gives the grittiness to China Rhubarb.) Other compounds are found deposited in the *vascular* system.

Plants built up with *Cellular* or *Vascular* Tissue may be divided as follows:

THALLOPHYTES—Plants with a flattened expansion, as Algæ.

CORMOPHYTES—Plants with a stem.

CRYPTOGAMIA—Flowerless plants........	Acrogens or summit growers.
PHÆNOGAMIA—Flowering plants.........	Endogens or inside growers. Exogens or outside growers.

PARTS OF THE PLANT.

If we take a living plant (out of the winter season) we always find, with a few immaterial exceptions, a *root, a stem or trunk, and leaves.* These three organs may therefore be considered as *essential* to the existence of the plant. They are called *Organs of Nutrition* because they contribute to its actual life.

But the death of the individual is a necessity in vital life; provision must therefore be made for the bringing into existence of a new plant similar to itself. The organs with this object in view are *Organs of Reproduction.* These consist of the so-called *flower* (with its parts) containing the *ovary* and *ovules,* which develop into the *fruit* with the *seed,* the latter producing the future individual.

The various organs of a plant in its most perfect form may be classified as follows:

ORGANS OF NUTRITION—Necessary for life.
- 1. Root.
- 2. Stem.
- 3. Leaf.

ORGANS OF REPRODUCTION—Necessary for the formation of a new plant.
- 4. Calyx.
- 5. Corolla.
- 6. Stamens
  - Filiment.
  - Anther.
  - Pollen.
- 7. Pistil....
  - Ovary.
  - Style.
  - Stigma.

CHANGING to........ ....
- 8. Fruit.
- 9. Seed.

ORGANS OF NUTRITION.

THE ROOT.

Difference between Root and Stem.

	ROOT.	STEM.
a.	1st growth—Downward.	Upward.
b.	2d growth—At extremity.	At sides, (inwards or outwards.)
c.	3d growth—Irregular branching of rootlets and absence of buds.	Regular ramification from buds.
d.	Internal structure—No pith or medullary rays.	Pith and regular formation.
e.	External structure—No epidermis, stomata, leaves or buds.	Epidermis, with stomata, leaves (generally) and buds (always.)

In considering the various kinds of Roots, we may class them as under : [*See fuller description in Manual of Botany.*]

- 1^c (A) True or tap root (primary).
- (B) Adventitious root (secondary).
  - ÆRIAL. Proceeding through air, from branches to earth.
  - EPIPHYTES. Roots in, and derives nourishment from, air.
  - PARASITES. Roots growing into the tissues of other plants and thence drawing their support.
- 2^c The above distinguished as....
  1. MONOCOTYLEDONOUS. Given off from one or several points above base of the radical, their structure internally resembles that of the stem.
  2. DICOTYLEDONOUS. Formed by direct prolongation of the radicle.
  3. ACOTYLEDONOUS. The "spore" gives off a root at any point of the surface.

THE TRUE ROOT is formed by the direct prolongation of the radicle—cells multiply by division immediately under the layer of cells at the extreme termination, these "vital" cells push away the outer layer and growth then proceeds in the cells behind them, the hard portion (vessels and wood cells) then forms. It has a species of bark and a cuticle when young. Roots that last only one year, are *annual;* if two years, *biennial;* but if longer, *perennial.* The functions of the root consist not only in fixing the plant firmly to the earth, but also in obtaining nutriment from the soil, and often in storing up organizable matter for its support.

When two fluids of different densities are separated by a permeable medium, two currents will be established---one outwards, called exosomos (exo Gr.. outwards; osmos, impulsion,) and one inwards, called endosmose, (endon, Gr., within,) which will continue until the fluids are of equal density. By means of such currents vegetative action is carried on. The fluid contents of roots are of greater density than the moisture of the soil; an *endosmose* current is, therefore, established, for which the root-hairs and the newest part of the root, protected by the spongioles, are the medium, accompanied also by a much smaller outward or *exosmose* current; evaporation continually going on in the exposed portions of the plant, the contained fluids are never reduced to the density of the medium in which they grow, hence the inward current or absorption, does not cease while vital action is unimpaired.

ADVENTITIOUS ROOTS are formed in some plants for the purpose of affording additional support to the stem.

In the ivy they serve the office of *tendrils.* From the branches of the Banyan they are produced downwards to the soil, in which they fix themselves, and develop true roots.

In the screw pine and mangrove they are developed in a similar manner from the lower parts of the stem, and become rooted in the soil.

THE STEM.

THE ASCENDING AXIS, bearing leaves and also the organs of reproduction; specially distinguished by the presence of leaves with leaf buds in their axils.

I. EXOGENOUS STEMS, (exo, Gr., outward; genano, to produce) or the structure of the stem of outside growers—increase by additions *on the outside of the wood*—at first cellular; at the end of the first year they present the following parts:

1. PITH.—Cellular tissue---in youth of tree filled with sap---large, in soft, small or obliterated in hard wooded and old trees.

2. WOOD.---Formed from the cambium layer which consists of specially vital cells immediately within the the bark. It comprehends:

a. *The Medullary Sheath* (spiral vessels) encircling the medulla (marrow) or pith.

b. *The Woody Tissue,* formed of wood cells, long, overlapping and much thickened by deposit, with occasional pitted vessels.

The wood proper is deposited in zones, generally well defined, one in each year, their number affording a clue to the tree's age. The interior, or heart wood, called also duramen, (from its greater hardness) is black in ebony, and brown in crocus wood, while the external layers of alburnum (albus, white) or sap-wood, are pale colored, soft and permeable.

c. *Cambium Layer* consists of vital cells containing elaborated nitrogenous sap. Between the external layers of wood, and the bark, a copious semi-fluid mucilage is found in the spring, to which the name of Cambium (cambia, Lat., to change,) has been given.

3. MEDULLARY RAYS.—Layers of tubular cells ("silver grain" of some woods,) connecting the pith and inner bark, thus dividing the woody tissue into segments. They radiate from the centre to circumference, and may be seen in any transverse section of Exogenous stems.

4. BARK.—Outer covering of stem, growing by additions internally; it consists of:

a. *Endophlœum* (endon within) or inner coat; this is the *liber* or *bast tissue* of wood cells. These bast cells are arranged variously in the parenchyma of the liber of different barks, (viz. radially, tangentially, &c.)

b. *Mesophlœum* or middle layer; green spongiform, cellular layer.

c. *Epiphlœum*, corky or suberous layer; dark, flat, tabular cells, often much developed.

d. *Epidermis*, or periderm (cuticle) is extended over all parts of the plant, exposed to the atmosphere, except the stigma.

II. ENDOGENOUS STEMS, or the structure of stems increasing by additions to the inside. No distinction of parts, there being no true pith, bark, or regular zones of wood—*fibro-vascular bundles, (wood cells, spiral and pitted vessels,) being destributed irregularly throughout the cellular system.* On the outside of the trunk there is formed a false bark or rind. Thus the stem of such a plant is limited in its lateral expansion—generally very tall and slender.

III. ACROGENOUS STEMS, or those growing at the summit, peculiar to flowerless plants. In mosses, &c., it is simply cellular; in the higher classes of ferns, it is a cellular mass, with simultaneous vascular bundles, arranged in wavy, plate-like masses, towards the outside; these bundles generally contain scalariform vessels; on the exterior is a rind marked with scars of fallen leaves. These stems grow only from the terminal bud. The *leaves* are called *fronds*, and the *petioles* are called *stipes*.

SUBTERRANEAN STEMS.

RHIZOME, (rhiza, Gr., a root,) or rootstalk; distinguished from roots by possessing scales (modified leaves,) or buds, (rudimentary leaves.) It is a thick, generally a procumbent sort of stem or *root stalk* partly, and sometimes entirely underground; develops roots from its under side and leaves from its upper. Its surface generally bears the scars left by the falling away of old leaves. It has nodes or joints, at which point they produce buds, which, in time, develop into a new plant. The thickened portion contains starch or other nourishing material, upon which the developing plant feeds.

TUBER (Lat. knob,) is a thickened portion of an underground stem or branch, which serves as a depository for starch and other nutritious secretions for the service of the plant; slender branches become enlarged at the growing end, by the accumulation there of this material. Ex. potato.

BULBS are subterranean buds or shortened stems surrounded by by thickened scales—roots from the under surface, directed downwards. The *Pseudo-bulbs* of *orchids*, are thickenings of the base of stems, by a deposit of bassorin; they are produced above the surface, and are of a green color, Ex-salep. New bulbs are formed like buds, in the axils of the scales.

CORMS, enlarged, solid, oval stem, or "base of stem" (Lindley) often amylaceous, producing buds on their upper surface and roots below.

(Bulbs, Pseudo bulbs and Corms are confined to endogenous Plants.)

SYNOPSIS.

- **Axial.**
  - Descending.
    - Simple.
    - Compound.
    - Adventitious.
  - Ascending.
    - Terrestrial.
      - Endogenous.
      - Exogenous...
        - Medullary system.
          - Pith or Medulla.
          - Medullary Sheath.
          - Medullary rays.
        - Ligneous system.
          - Duramen.
          - Alburnum.
        - Cortical system.
          - Liber.
          - Mesophlœum.
          - Epiphlœum.
      - Acrogenous.
    - Subterranean.
      - Rhizome.
      - Tuber.
      - Corm.
      - Bulb.

LEAVES.

These are lateral expansions of the cellular tissue of the stem circumference, with veins as a continuation of the *vascular* system. The *cellular system* surrounds the fibro-vascular ramifications in two layers; the cells contain chlorophyll and are loosely connected. The *epidermis* is on both sides. The *stomata* (breathing pores) chiefly on the under side.

Submerged leaves consist wholly of cellular tissue.

LEAF VARIATION IN:

	VENATION.	MARGIN.	STIPULES,	ARRANGEMENT
Dicotyledons,	Reticulated,	Indented,	often present	Compound or simple,
Monocotyledons,	Parallel,	Entire,	absent,	Simple,
Acotyledons,	Forked,	Much cut,	absent,	Compound.

PARTS.—*Blade; Petiole; Stipule,* (*sheath and ligule,* common in grasses;) *Tendril.*

FRAMEWORK.—*Midrib, rib, Vein and Veinlet.*

THE LEAF MAY BE,

Simple, (as Digitalis,) when the blade is of one piece.
Compound, (as Conium,) when the blade consists of two or more pieces borne upon a common leaf stalk.

THE ARRANGEMENT MAY BE, *Alternate, Opposite or Whorled.*

FORM.—BROAD AT THE MIDDLE—
Peltate, (shield shape)
Orbicular (circular.)
Oval, (egg shaped, widest in middle)
Elliptical, (long, the two ends alike in width.
Oblong, (twice or thrice as long as broad).
Linear, (long and narrow—same breadth throughout.)

BROAD AT BASE—*Deltoid,* (triangular.)
Ovate. (egg shaped, widest at *the base.*)
Lanceolate, (lance shaped.)
Subulate, (awl shaped.)
Cordate, (heart shaped.)
Reniform, (kidney shaped.)
Hastate (halberd shaped.)
Sagittate, (arrow shaped.)

BROAD AT APEX—*Obovate,* (reversely ovate, widest *at apex.*)
Oblanceolate, reversely lanceolate, tapering point downwards.
Spathulate, (resembling a spoon).
Obcordate, (reversely heart shaped.)

MARGINS.—*Entire*—*Repand,* (wavy);
Sinuate, (strongly wavy.)
Crenate, (with convex serratures).
Dentate, (with concave serratures,)
Serrate, (indented like a saw.)
Lacinate, (cut into narrow lobes.)
Divided, (divisions extending *about* to the midrib).
Bi and Tri-lobate, (varieties of divided leaves.)
Bi and tri-fid, (twice and thrice cleft.)

COMPOUND (when divided *down to midrib,* so that the subdivisions appear as distinct leaves, (called leaflets.)
Pinnate, (leaflets arranged along the sides of a petiole.
Bi and Tri-pinnate, (when each leaflet is *again* divided, twice or thrice upon itself *in a pinnate manner.*)
Ternate, (when composed of three leaflets.)
Bi and tri-ternate, when each leaflet is *again* divided twice or thrice upon itself, *in a ternate manner.*
Palmate, divisions five, resembling the hand.
Bi and tri-palmate when each leaflet is *again* divided twice or thrice upon itself *in a palmate manner.*

APEXES.—*Emarginate,* (notched.)
Truncate, (cut off at top).
Obtuse, (blunt at end).
Acute, (sharp pointed).
Acuminate, (sharp pointed, but the summit prolonged into a tapering point).
Mucronate, (tipped with an abrupt sharp point.)

SURFACE.—*Glabrous,* (without hairs).
Pubescent, (soft, dense and short hairs).
Villous, (dense and long hairs.)
Tomentous, (matted and felt like).
Scabrous, (stiff hairs, minute, hard points).
Hispid, (few and short hairs.)
Spinous, (beset with spines.)

TEXTURE.—*Succulent,* (fleshy).
Coriaceous, (leathery).
Rugous, (wrinkled.)

INFLORESENCE.

INDEFINITE OR INDETERMINATE—CENTRIPETAL—*An arrangement where the outer flowers or those lowest on the axis bloom first.*

Flowers pedicelate.	RACEME.	Flowers arranged along the axis and the pedicels of equal length. Ex. Currant.
	CORYMB.	Same as Raceme, except that *the lower pedicels are elongated, making the top flat.* Ex. Hawthorn.
	UMBEL.	Same as Corymb, except that *the pedicels branch from the same point.* Ex. Milkweed.
	PANICLE.	Racemed on main axis, and corymbed on secondary axis. Ex. The Grasses.
	THYRSUS.	A compact panicle. Ex. Lilac.

DEFINITE OR CENTRIFUGAL.—*Flowers all terminal. Centre flowers bloom first.*

Flowers Sessile.	SPIKE.	Raceme with Sessile flowers.
	SPADIX.	Fleshy spike, generally enveloped by a large bract called a spathe.
	AMENT OR CATKIN.	A slender pendant spike, with scaly bracts and male or female flowers.
	HEAD OR CAPITULUM.	A shortened spike reduced to a globular form. Ex. Clover and flowers of the Compositæ.

PARTS OF THE FLOWER.

These consist of:

The Floral Envelopes.
- Calyx (its divisions—Sepals.)
- Corolla (its divisions—Petals.)
- } Perianth.

Essential or Reproductive Organs.
- Stamens....
  - Anther,...... Pollen grains.
  - Filiment,
- Pistil.......
  - Stigma,
  - Style,
  - Ovary........
    - Carpels.
    - Ovules.

CALYX—The outer whorl, generally green, its component leaves, sepals. If colored, they are called *petaloid* (or like petals,) in which case the whole circle is called perianth. This principally occurs in endogenous plants. The calyx may be Monosepalous (or sepals united), or Polysepalous (or sepals, separate.)

The adnation may be
Inferior—below and encircling the ovary,
Superior—above and adherent to the ovary,
Pappose—hairy and adherent to the ovary as in compositæ, &c.

COROLLA.—(Lat. a little crown.) The bright, inner whorl of the floral envelopes, generally the showy portion of the flower. Its leaves are termed petals. The corrolla may be:

- **Polypetalous.**
  - *Regular.* Ex. Cruciform (as in Cruciferae,) &c.
  - *Irregular.* Ex. Papilionaceous, (as in Leguminosæ.)
- **Monopetalous.**
  - *Regular*
    - Ex. Campanulate (Bell shaped as in Belladonnæ.
    - Tubular, as in Compositæ, Rotate, &c.
  - *Irregular*
    - Labiate, or lipped.
    - Personate.
    - Ligulate, &c.

The adnation may be:
Inferior—Hypogynous—under the pistil or ovary,
Half Inferior—Perigynous—around the pistil or ovary.
Superior—Epigynous—at the summit or above the pistil or ovary.

STAMENS, considered as the male organs of the plant. The active influence of the pollen from the anthers being necessary to the fertilization of the ovule.

Kinds.—a. *Number.* Mo, di, tri, tetr, pent, hex, hept, oct, enne, dec, dodec, poly-androus.
Icosandrous, more than twelve, inserted on the calyx.
Polyandrous, more than twelve inserted on the receptacle.

b. *Adnation.* Hypogynous borne on the receptacle.
Perigynous, " " calyx.
Epipetalous " " petals.
Epigynous " " ovary.
Gynandrous " " style.

c. *Cohesion.* Syngenesious—united by their anthers.
Mon, di, tri, poly-adelphous, united by by their filiments.
d. *Unequal in length.* Didynamous—two long and two short.
Tetradynamous—four long and two short.

PISTILS.—The female organs of reproduction. They consist of folded carpels, one (simple) or more (compound.) The carples represent a folded or modified leaf. The back is the *dorsal* suture, the face (or union of margins) the *ventral* suture.

A pistil is composed of:

The Style (or stalk) supporting the Stigma, which may be absent; it is then sessile, (as in the Poppy.)
The Stigma (or apex of the style) generally covered with a viscid fluid to hold the polen grains.

Ovary, containing the ovule or future seed found at the base of the style.

Parts. Carpels, Placentæ, Dissepiments (true and false) cells, ventral and dorsal sutures.
Adnation. Superior or inferior to calyx (ripening into superior or inferior fruit.)
Placentation. Free-central, Axillary, Parietal.

Ovule.—

Parts.—Nucleus, Secundine, (*interior coat,*) Primine, (*exterior coat.*
Microphyle, (Foramen.) Funiculus, Hilum, Chalaza, Raphe. (For definition, see seeds.)

Direction in Ovary.

Erect, when attached to base of ovary.
Ascending, attached to side pointing upward.
Inverted, or pendulous, suspended from top.

FRUIT.

It is the ovary after the fertilization of the ovule.
Consists of *two parts*, each having coats, &c., as follows:

I. Pericarp.
- EPICARP, (outer coat.)
- MESOCARP, (if fleshy, *Sarcocarp.*)
- ENDOCARP, (if stony, *Putamen.*)

2. Seed.

- Integuments, and their parts.
  - 1. TESTA. Outer or proper seed coat.
  - 2. TEGMEN. Inner coat, (sometimes wanting.)
  - 3. FUNICULUS. The stem to which the seed is attached.
  - 4. HILUM. The point of attachment on the seed.
  - 5. CHALAZA. The point where the coverings and nucleus join.
  - 6. MICROPHYLE. The orifice of the (now closed) ovule.
  - 7. RAPHE. The ridge connecting the hilum and the chalaza.
- Nucleus, composed of
  - 8. ALBUMEN. The flowery part.
  - 9. EMBRYO, (or germ,) *consisting of*
    - Radicle.
    - Cotyledon.
    - Plumule.

(In many seeds the kernel is all *Embryo*—others, the largest part is the *Albumen.*)

KINDS OF FRUIT.

SIMPLE FRUITS, formed by a single pistil.

Fleshy.

- BERRY. Rind membranous. Ex. Grape.
- HESPERIDIUM. Rind leathery, separable. Ex. Orange.
- PEPO. Rind hard. Ex. Cucumber.
- POME. Seeds in cells, succulent calyx. Ex. Apple.

Stone. (Indehiscent--one celled; Endocarp—hard,)

- DRUPE. Three coated, stone cell entire. Ex. Peach.
- ETAERIS. An aggregation of drupes. Ex. Raspberry.

Dry, indehiscent.

- ACHENIUM. A one-seeded, seed-like fruit. Ex. Compositæ.
- SAMARA. Achens or nuts, furnished with a wing. Ex. Maple.
- CREMOCARP. A half-fruit, two-celled, two seeded. Ex. Umbeliferæ.

Dry, dehiscent.

- Follicle. A simple pod, opening down the inner suture.
- Legume. A simple pod, dehiscent into two pieces.
- Loment. A pod which separates transversely into joints.
- Capsule. Any dry, dehiscent, seed vessel.
- Silique. The long pod of the Mustard family.
- Silicle. The short pod of the Mustard family.

Compound Fruit. Fruit from several pistils combined.

Strobile, (or cone,) collective head, generally conical, of numerous hard, membranous bracts, covering naked seeds.

Galbalus. Small, rounded cone, with succulent, enlarged scales. Ex. Juniper berry.

FORMS OF SEED.

Orthotropous. Straight; no change in direction of parts. Ex. Buckwheat.

Campylotropous. Curved; the mycrophyle brought near the chalaza. Ex. Cruciferæ.

Anatropous. Inverted, mycrophyle brought near the Funiculus. Ex. Volet.

Amphitropous. Half inverted, short raphe. Ex. Mallow.

Texture of Albumen. *Farinaceous, Oily, Fleshy, Mucilaginous.*

Texture of Covering. *Membranous,* papery; *Crustaceous,* bony.

Number of Cotyledons. *Mon, di, poly, cotyledonous.*

BOTANICAL ARRANGEMENT OF PLANTS.

The two great ends of classification, are: 1st, To exhibit the relationship existing among plants, and bind them into a systematic whole. 2d, To enable the learner to readily ascertain the name and place in the system. The necessity of classification, to facilitate study, is no better exemplified in any branch of science than Botany. From the earliest times in which we have any record of the study of plants, botanists appear to have felt the want of some mode of throwing them into groups; but the difficulty has been to know what parts of the plant are to be compared; to discover which plants most resemble each other; and on this score the most eminent botanists have differed. Some, as for example, Tournefort, chose the flower, and placed all the plants that had cup-shaped flowers in one class, and those that had bell-shaped flowers in another. Others, as for example, Caesalpinus, took the fruit for the point of comparison, and put all the plants with globe-shaped fruits in one class, those having flat fruits in another, &c.

None of these, however, were followed; and not until Linnæus' time did any method become popular. His method based upon the number of stamens and pistils, seemed to place within the reach of every one who could count, a simple method of classification. The imperfections of this method, in time, became apparent to students of Nature. Plants thus classified were thrown together, having no natural analogy; hence, in later days, his system (called the artificial or sexual system, because founded on the stamens and pistil) has given place to the now popular NATURAL SYSTEM, which has been the base of works for the past sixty years. It was first suggested by Jussieu, greatly improved by De Candolle, Lindley, Gray, and others. All botanists, of whatever school, divide plants into classes, orders, genera, species and varieties.

CLASSES. Plants resembling each other in some grand leading features, although differing in minor particulars. Ex. Exogens and Endogens.

NATURAL ORDERS, OR FAMILIES. These terms are interchangeable. The former used with the Latin name of the group, the latter with the English. Thus, Ord. Magnoliaceæ---Magnolia family. Orders consist of a number of plants that very closely resemble each other in some leading particular. They may have the same fruit or some such marked features or properties in common. They are groups of kindred genera, generally named by extending the name of the principal genus, in the nominative plural, *e. g.*, Rosæ, Rosaceæ, short expression for Plantæ Rosaceæ, Rosaceous plants.

The family resemblance in many of the orders is so prominent, that to even the uneducated eye, it is quite discernable. Ex. Compositæ, Cruciferæ, Leguminosæ, Umbelliferæ, &c.

GENERA, (plural for Genus). By the binominal system of nomenclature, the botanical name of a plant expresses its generic and specific origin, the former being a substantive, as *Quercus;* the latter, generally an adjective, as *alba*, *rubra*, *&c.*

Plants which are members of the same *genus* oftentimes resemble each other, not only in the position and number of the organs of fructification, but in the same general appearance of the flower.

SPECIES. Indicates the individual plant, a collection of which composes the genus. Species are distinguished by some marked peculiarity of form or construction, so as to be easily recognized.

VARIETY. Indicates the individuals of a species, which differ from each other in some not very important points, such as having double or semi-double flowers, &c.

GENERAL CLASSIFICATION.

CLASS I.

EXOGENOUS OR DICOTYLEDONOUS PLANTS.

a. POLYPETALOUS DIVISION, with both calyx and corolla, the latter of wholly separate petals.

b. MONOPETALOUS DIVISION, with both calyx and corolla, the latter united more or less into one piece.

c. APETALOUS DIVISION, i. e., with only one sort of floral envelope, or even none at all.

CLASS II.

ENDOGENOUS OR MONOCOTYLEDONOUS PLANTS.

a. SPADICEOUS DIVISION. Flowers on a spadix or fleshy spike. Perianth, none, or not corolla like, no glumes.

b. PETALOIDEOUS DIVISION. The flowers not on a spadix, and the perianth, or part of it, more or less corolla like.

c. GLUMACEOUS DIVISION. The flowers enveloped by glumes, (chiefly bracts,) no manifest perianth.

NATURAL ORDERS.

In exhibiting the relationship which subsists among plants,and to bind them into a systematic whole, they are always arranged in such order, and under such successive grades, that each group shall stand next to those which it resembles in all, or in the most important respects, thus showing the plan of nature in the vegetable world. In this list of some of the *prominent orders,* such an arrangement is adhered to (following Gray's classification.) The most perfectly organized plants are represented in the first order, descending from this by successive gradation to the least perfectly organized. [*For* COMPLETE DESCRIPTION *of Orders, see Manual of Botany.*]

CLASS I.—EXOGENOUS OR DICOTYLEDONOUS PLANTS.

a. Polypetalous Division.

RANUNCULACEÆ. *Crow-foot family*

HERBS, with acrid, watery juice.

LEAVES. Stalks dilated at base, exstipulate.

STAMENS, numerous, hypogynous.

FRUIT, follicles or achenia; *carpels,* distinct; *embryo,* minute.

SEED, small, fleshy albumen.

(Sepals, petals, stamens, pistils, all distinct and unconnected.)

Sub Order.—1. RANUNCULÆ, Fruit, achenia.
" " 2. ACONITÆ, Fruit, follicles.
" " 3. CLEMATÆ, only one, with opposite leaves.

MENISPERMACEÆ. *Moonseed family.*

WOODY CLIMBERS, bitter, tonic, and narcotic plants.
LEAVES, alternate, palmate or peltate, exstipulate.
FLOWERS, small, *sepals and petals* similar, in two or more rows, imbricated in bud.
Hypogynous, *diœcious*, 3—6–gynous.
FRUIT, a one-seeded drupe; large or long, curved embryo in scanty albumen.

PAPAVERACEÆ. *Poppy family.*

HERBS, juice, milky or colored and narcotic.
LEAVES, alternate, exstipulate.
FLOWERS, with parts in two or four.
Calyx, deciduous, two sepals.
Petals, spreading, imbricated or crumpled in bud.
Stamens, numerous, distinct.
FRUIT, a one-celled pod, many seeded.
SEEDS, with fleshy or oily albumen.

CRUCIFERÆ. *Mustard family.*

HERBS, with watery, pungent juice.
FLOWER, cruciform, tetradynamous.
SEEDS, campylotropous, no albumen, filled by large *Embryo*, which is much curved.
FRUIT, a pod, either a Silique or Silicle.

CISTACEÆ. *Rock Rose Family.*

LOW SHRUBS AND HERBS, Leaves, simple, mostly entire; the lower, opposite; upper, alternate.
FLOWERS, regular, distinct, Hypogynous.
Calyx, persistent.
Corolla, three to five petals.
Stamens, indefinite.
FRUIT, one-celled, three to five valved pod, with as many parietal placentæ borne on the middle of the valves.
SEEDS, albuminous, orthotropous.

LEGUMINOSÆ. *Pulse family.*

LEAVES, alternate stipulate, usually compound.
FLOWERS. *Corolla*, *Papilionaceous*, seldom *regular*.
Stamens, ten, in one or two bundles—*Mono* or *Diadelphous*.
Ovary, one-celled, one or many seeded.
FRUIT, a *Legume*.
SEEDS, without albumen.

Sub Order.—1. PAPILIONACEÆ. *Proper pulse family.*
" " 2. CÆSALPINIEÆ. *Brasiletto family,*—imperfectly or not at all papilionaceous, sometimes nearly regular.
" " 3. MIMOSÆ. *Mimosa family.* Flower regular, *Corolla* valvate, in aestevation.

ROSACEÆ. *Rose family.*

TREES, SHRUBS OR HERBS.
LEAVES, alternate, stipulate.
FLOWERS, regular.
Stamens, indefinite, unconnected, inserted on calyx.
Pistils, distinct, with one or many ovules.
Seeds, exalbuminous.
FRUIT, Pome, drupe, follicle, nut, achenium.

Sub Order.—1. TREE OR SHRUB. AMYGDALEÆ. *Almond family.*
CALYX, entirely free from the usually solitary ovary, decidious.
FRUIT, a drupe.
BARK, exuding gum. Bark, leaves and kernels, yielding the peculiar flavor of *Prussic acid.*
" " 2. ROSACEÆ proper,
FRUIT, generally achenia.
CALYX, sometimes enclosing the ovaries in fruit, but generally free, as in sub order one.
" " 3. POMEÆ. *Pear family.*
CALYX, tube thick and fleshy in fruit, including and combined with the two to five ovaries forming in FRUIT a *Pome.*

UMBELLIFERÆ. *Parsley family.*

HERBS, with *hollow* stems.
FLOWERS, small, in *umbels.*
Petals, five.
Calyx, adherent to two-celled ovary.
Ovule, single, hanging from summit of each cell.
Stamens, five inserted on disk that covers the ovary and surrounds base of two styles.
FRUIT, (A CREMOCARP) dry, usually splitting in two seed like portions or akenes, containing Vol. Oil, lodged in tubes called vittæ. [*For Sub Orders, see characteristics of Fruits.*]

b. Monopetalous Division.

RUBIACEÆ. *Madder family.*

TREES, SHRUBS OR HERBS.
LEAVES, opposite, entire, connected by interposed stipules, or in whorls, without apparent stipules.
FLOWERS, generally perfect, often dimorphous.
Calyx, coherent with the two to four-celled ovary.
Corolla, regular, three to five lobed.
Stamens, as many as lobes of corolla, and inserted on its tube.
SEEDS, having a pretty large embryo, in copious albumen.

Sub Order.—1. STELLATÆ, leaves in whorls, no stipules.
" " 2. CINCHONEÆ, leaves rarely, in whorls, with stipules.

COMPOSITÆ. *Composite family.*

HERBS, or few SHRUBS—large family inhabiting temperate regions.
FLOWERS, in close heads, on a common receptacle, surrounded by an involucre.
Calyx, tube united with one-celled ovary, the limb, (called a *pappus*) consisting often of bristles, awns, scales, teeth, &c.
Corolla, strap-shaped or tubular.
Stamens, (generally five,) united into a tube by their anthers, (syngenesious.)
Style, two cleft at apex.
FRUIT, seed-like (*achenium*) dry, containing a single erect anatropous seed, with no albumen.

Sub Order.—1. TUBULIFLORÆ, corolla tubular, *ray flowers*, sometimes ligulate and imperfect.
" " 2. LIGULIFLORÆ, corolla ligulate in all the flowers of the head, which are all perfect.

LOBELIACEÆ. *Lobelia family.*

HERBS, with milky juice.
LEAVES, alternate.
FLOWERS, scattered.
Calyx, tube adherent to a many-seeded pod.
Corolla, irregular, monopetalous, five-lobed.
Style, one stigma; often fringed.
Stamens, (five,) free from corolla, united by their filaments and anthers, forming a tube.
FRUIT, two-celled capsule, large number of seeds.

POWER, acrid, poisonous plants—The order is regarded as part of the order Campanulaceæ, (campanula family,) which has bell-shaped showy flowers, &c.

RICACEÆ. *Heath family.*

SHRUBS AND HERBS.

LEAVES, simple, mostly alternate.

FLOWERS, regular.

Stamens, as many, or *twice* as many as the *lobes* or *petals* of corolla.

Anthers, two-celled, each cell opening by a pore or hole at end.

Style, one.

Ovary, as many celled as lobes to corolla.

Seeds, small, anatropous.

Embryo, small, albumen, fleshy.

Sub Order.—1. VACCINIEÆ. *Whortleberry family.*
" " 2. ERICINEÆ. *Proper Heath family.*
" " 3. PYROLEÆ. *Pyrola family*, (ex. chimaphila.)
" " 4. MONOTROPEÆ. *Indian pipe family.*

CROPHULARIACEÆ. *Figwort family.*

HERBS, *rarely* trees, bitterish. Some narcotic poisonous plants.

FLOWERS, irregular; corolla, two-lipped.

Stamens, *Didynamous* or *Diandrous*, inserted on tube of corolla.

Ovary, two-celled.

FRUIT, capsule many-seeded.

SEEDS, anatropous, small embryo, copious albumen.

Sub Orders, distinguished by *æstivation* of corolla.
" " 1. ANTIRRHINIDEÆ, upper lip covering the lower in the bud.
" " 2. RHINANTHIDEÆ, under or lateral lobes of the corolla, covering the upper in the bud.

ABIATÆ. *Mint family.*

HERBS, chiefly with square stems.

LEAVES, opposite, aromatic, exstipulate, dotted with small glands, containing volatile oil.

FLOWER.

Corolla, two-lipped, (bilabiate.)

Calyx, persistent.

Stamens, didynamous, (two long, two short.)

Ovary, deeply four lobed.

FRUIT, one to four achenia. Seeds, no albumen.

SOLANACEÆ. *Nightshade family.*

HERBS, rarely shrubs, colorless juice.
LEAVES, alternate, rank-scented.
FLOWERS, regular.
  Calyx, persistent.
  Corolla, five merous.
  Stamens, five.
FRUIT, a berry or capsule.

GENTIANACEÆ. *Gentian family.*

SMOOTH HERBS, bitter, tonic plants, colorless juice.
LEAVES, opposite, sessile, entire and simple, generally exstipulate.
FLOWERS, regular.
  Stamens, As many as the lobes of the corolla, which are convolute in the bud, (rarely, imbricated.)
  Ovary, one-celled, with a parietal placentæ.
FRUIT, usually a two-valved and septicidal, many-seeded capsule (or pod.)
SEEDS, anatropous, minute embryo, in fleshy albumen.,

LOGANIACEÆ. *Logania family.*

HERBS, SHRUBS OR TREES.
LEAVES, opposite and entire stipulate, or a stipular line between base of the leaves.
FLOWERS, regular, perfect, four or five merous.
  Stamens, as many as the lobes of the corolla, and alternate with them.
  Ovary, free from calyx.

c. Apetalous Division.

ARISTOLOCHIACEÆ. *Birthwort family.*

TWINING SHRUBS and LOW HERBS.
LEAVES, petioled, heart-shaped, entire.
FLOWERS, perfect, conspicuous, lurid.
  Calyx, Valvate in bud, and coherent (at least at the base) with the ovary.
  Stamens, six to twelve, more or less united with style.
  Anthers, adnate, extrorse.
  Ovary, six celled, many seeded.
FRUIT, a pod or berry.

EUPHORBIACEÆ. *Spurge family.*

PLANTS, with juice, milky and acrid.
FLOWERS, Monœcious or diœcious, mostly apetalous.
Stigmas, or branches of the style, as many or twice as many as the cells in the ovary.
Ovary, free, usually three-celled, a single or sometimes a pair of ovules hanging from summit of each cell.
FRUIT, commonly three-lobed pod, separating elastically, from a persistent axis.
SEED, two-valved, anatropous.
EMBRYO, Straight, nearly as long and as wide as the fleshy or oily albumen.

URTICACEÆ. *Nettle family.*

HERBS AND TREES, inner bark tough.
LEAVES, with stipules, often deciduous.
FLOWERS, monœcious or diœcious, rarely perfect.
Calyx, regular, free from ovary.
Stamens, as many as the lobes of calyx, and opposite them.
Ovary, one-celled, (rarely two-celled.)
FRUIT, one-seeded, cotyledons, usually broad, embryo, (when there is any) its radicle pointing upwards in albumen.

Sub Order.—1. ULMACEÆ. *Elm family.*
TREES, with watery juice, leaves alternate.
FLOWERS, usually perfect.
Styles or *Stigmas*, two.
FRUIT, a drupe or samara.

Sub Order.—2. ARTOCARPÆ. *Bread-fruit and fig family.*
TREES, or shrubs, juice milky, (acrid or poisonous.) Leaves alternate.
FLOWERS, crowded in catkin-like spikes or heads.
Calyx, &c., becoming fleshy or juicy in fruit.
Styles or STIGMAS, commonly two.

Sub Order.—3. URTICÆ. *Nettle family proper.*
HERBS, bark tough, fibrous. Juice bland and watery.
LEAVES, alternate or opposite, covered with stinging hairs.
FRUIT, an achenium.
EMBRYO, straight in axis of albumen.

Sub Order.—4. CANNABINÆ. *Hemp family.*

HERBS, tough bark. Juice watery.

LEAVES, opposite and palmately lobed or compound.

FLOWERS, diœcious, green, sterile, racemed, or panicled; fertile, in clusters or catkins.

CALYX, of one sepal.

SEED, no albumen.

CONIFERÆ. *Pine family.*

TREES or SHRUBS, (wood destitute of ducts) composed chiefly of homogeneous, large woody fibre, which is marked with circular disks on two sides.

JUICE, resinous.

LEAVES, mostly awl shaped, or needle shaped.

FLOWERS, monœcious, rarely diœcious in catkins, destitute of calyx or corolla.

Ovules, orthotropous, embryo in axis of the albumen, nearly its length.

Sub Order.—1. ABIETINEÆ. *Proper Pine family.*

FERTILE FLOWERS, in catkins, with bracts.

CARPELS, in the form of scales, in the axil of a bract forming a strobile or cone in *fruit.*

Sub Order.—2. CUPRESSINEÆ. *Cypress family.*

FERTILE FLOWERS, consisting of few carpellary scales without bracts.

FRUIT, a closed strobile, or a sort of drupe.

Sub Order.—3. TAXINÆ. *Yew family.*

FERTILE FLOWERS, solitary, consisting of a naked ovule, ripening into a nut-like or drupe-like seed.

CLASS II. MONOCOTYLEDONOUS ENDOGENOUS PLANTS.

a. Spadiceous Division.

ARACEÆ. *Arum family.*

PLANTS, with acrid or pungent juice.

LEAVES, simple or compound, often veiny.

FLOWERS, crowded on a spadix, which is usually surrounded by a spathe.

SEEDS, with fleshy albumen or none, but filled with the large fleshy embryo.
FRUIT, a berry usually.

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b. Petaloideous Division.

ORCHIDACEÆ. *Orchis family.*
HERBS, sometimes parasites or epiphytes.
ROOTS, tuberous or fibrous.
LEAVES, entire often sheathing.
PERIANTH, (or petaloid calyx and corolla, consisting of *six* apparent petals) irregular, the three inner petals larger, and one, (called labellum or lip) of unusual shape, and larger than the others.
Stamens, gynandrous, forming one column, with the pistil.
Ovary, one-celled.
Stigma, viscid, spot in front of the gynandrous column.
FRUIT, a twisted capsule, one-celled many seeded ; parietal placentæ.

IRIDACEÆ. *Iris family.*
HERBS, ROOTSTALKS, TUBERS, or CORMS, acrid.
LEAVES, equitant, two-ranked, and regular or irregular.
FLOWERS, perfect, the divisions of the calyx, six cleft.
Perianth, petal like, convolute in bud, in two sets.
Stamens, three, distinct or monadelphous, alternate with the inner divisions of the perianth.
Ovary, three-celled,
Anther, extrorse.
POD, three-celled, loculicidal, many seeded.
SEEDS, anatropous, embryo, straight in fleshy albumen.

LILIACEÆ. *Lily family.*
HERBS, or rarely Woody Plants.
FLOWERS, regular, symmetrical, almost always 6–androus.
Perianth, free from the chiefly three-celled ovary.
Stamens, one before each division of ovary.
Anthers, two-celled.
FRUIT, a many-seeded pod or berry, small embryo enclosed in copious albumen.

MELANTHACEÆ or COLCHICACEÆ, much resembles LILIACEÆ. (Tribe 2, of the above)

c. Glumaceous Division.

GRAMINEÆ *Grass family.*

STEMS, (culms) hollow closed at joints, fibrous roots.

LEAVES, alternate, two ranked.

FLOWERS, imbricated, with two-ranked glumes or bracts, the outer pair (glumes proper) subtending the spikelet of one or several flowers, the inner pair, (paleæ or palets) enclosing each particular flower.

OVARY, one-celled, one-ovuled, forming a seed-like grain (caryopsis,) embryo, small on the outside and at base of the floury albumen.

ORGANIC MATERIA MEDICA.

THE

CHARACTERISTICS, CONSTITUENTS, ADULTERATIONS, ETC., OF DRUGS.

ROOTS.

I—MONOCOTYLEDONOUS OR ENDOGENOUS.

SARSAPARILLA. *Smilax officinalis.* Sarsaparilla.

This is afforded by several woody climbers, habitating South America, Central America and Mexico. Its botanical source is a matter of controversy, although the above is generally recognized. The varieties used in medicine have a thick, short, knotty rhizome, from which grow in a horizontal direction the fleshy roots. These appear in commerce several feet in length, and about the thickness of a quill, cylindrical and flexible, thick exterior cortical portion, covered with a thin and easily separated epidermis; this epidermis varies in color according to the variety. On a *transverse section* its woody bundles are seen to be confined to the central part, enclosed by a brown ring. Within this ring the bundles are closely united to form a woody zone. The very centre of the section consists of white medullary tissue, through which wood bundles are sometimes scattered. On a *longitudinal section* the epidermis shows several rows of elongated cells. The parenchymatous cells, if not devoid of solid contents, are filled with starch granules, and occasionally crystals of CaOx. The various sorts of S. differ, not only in being mealy, or non-mealy, but also as regards the thickness of the woody zone. They are all of a slightly acrid taste, and of little odor. The thin, wiry roots are not employed medicinally.

VARIETIES.

Honduras—Mealy,	Pale-brown epidermis,	Abounds in starch.
Guatemala— "	Orange "	Little starch.
Jamaica—Non-mealy,	Red "	Free from starch.
Mexican— "	Dull-brown "	" "

Its interesting principle is variously termed Smilacin, Salseparin, Parillinic acid. It occurs in the form of colorless acicular crystals, and is of a persistent acrid taste. This principle is analagous to the Saponinoid principle of Seneka. The Mexican variety yields the most (2 per cent).

II—DICOTYLEDONOUS OR EXOGENS.

FLESHY ROOTS WITHOUT STARCH.

A. *Inulin, Laticiferous vessels.*

TARAXACUM. *T. Dens-Leonis.* Dandelion.

This grows mainly in grassy spots, inhabiting Europe and North America. It is several inches in length, half an inch or less in thickness, round and tapering; light brown externally, whitish within, and abounding in an inodorous, milky juice, of a bitter taste. It shrinks very much in drying, losing about 76 per cent. in weight. In the dried state, it is dark brown, shrivelled with wrinkles running longitudinally, often in a spiral direction; brittle, and when broken, presents a shining, resinous fracture, showing a very thick white bark, surrounding a woody column. The latter is yellowish, very porous, without pith or rays; a rather broad but indistinct cambium zone separates the wood from the bark, which latter exhibits numerous concentric layers. The laticiferous vessels have parenchyma and medullary rays between them. The root may be said to be vertically traversed by ten to twenty concentric rings of laticiferous vessels. The tissue of the dried root is loaded with inulin. It is directed to be collected in autumn. No odor—taste sweet in winter, bitter in autumn, very bitter in spring. It contains large quantities of sugar (about 36 per cent.) in winter; this is converted into inulin. Taraxacin, its principle, is obtained from the thick juice.

It is frequently adulterated with Chicory, from which it may be distinguished by the latter having the laticiferous vessels in radial lines, and the juice of a brighter color, and much more bitter.

LAPPA. *L. Minor.* Burdock.

Spindle-shaped root, several inches in length, about an inch thick, brown externally, white and spongy within, furnished with thread-like rootlets, and having withered scales near the summit. The young root has a thick bark; the old a thin. Should be collected in the spring of the second year; it loses four-fifths of its weight on drying. Inodorous, the taste is mucilaginous and slightly sweet. Inulin and sugar are its constituents.

B. *Inulin, Resin Cells.*

PYRETHRUM. *Anacyclus Pyrethrum.* Pellitory.

The variety generally known as Roman Pellitory, is intended by the U. S. P. This is simple, three to four inches long by about half an inch thick, conical, some at times, terminated at the top, by the remains of leaves, and having only a few hair-like rootlets. It has a brown, rough, shrivelled surface, compact and brittle, the fractured surface being radiate, and destitute of pith. The thin bark adheres closely to the wood, a narrow cambium line between. The woody column is crossed by large medullary rays, in which, as in the bark, numerous dark resin ducts are scattered. Most of the parenchymatous cells are loaded with inulin; pellitory abounding in this principle, containing near thirty-five per cent. German pellitory obtained from A-officinarum, is also used medicinally. This is of a grayish color, and is only half as thick as the above. Both have a slight aromatic odor, and a persistent, pungent taste, exciting a singular tingling sensation, and a remarkable flow of saliva. This pungency is due to the resin.

INULA. *I. Helenium.* Elecampane.

This is a stately plant, widely distributed. It is collected from plants two to three years old; when older, it is too woody. On account of its fleshy nature, it is cut into slices of various sizes, and then dried, which occasions them to curl up irregularly. The smaller roots are dried entire. When dried, they are of a light gray, brittle, horny, smooth fractured. Cut transversely, it shows an indistinct radiate structure, with a somewhat darker cambial zone separating the thick bark from the woody nucleus. The pith is not well defined, and is often wanting. In the old roots, the bark is relatively thin, and the internal structure is nearly uniform. The medullary rays exhibit large balsam ducts. Aromatic odor, suggestive of orris and camphor, and a slightly bitter, warm, aromatic taste.

Helenin and Alant camphor (Elecampane-camphor) are its important constituents. A volatile oil, and a large per cent. of inulin is also present. Inulin derives its name from this plant. It has the same composition as starch, but differs, to a certain extent, from that substance, which it replaces in the roots of the Compositæ; it has not been detected in plants of any other tribe. It is dissolved in the watery juice of the living plants, and is deposited, on drying within in the cells, in amorphous masses, which in polarized light, are inactive, and are not colored by iodine. It is deposited, from its solution in hot water on cooling; its solution is levogyre, and easily transformed into glucose, nor does it afford an explosive compound with nitric acid.

The amount of inulin varies according to the season, but is most abundant in autumn.

C. *Astringent.*

HEUCHERA. *H. Americana.* Alum Root.

It is found in shady, rocky places. The whole plant is covered with a viscid pubescence. The root is horizontal, somewhat compressed, knotty, irregular, yellowish, and of a strongly styptic taste. Contains about 20 per cent. of tannin.

RUBIA. *R. tinctorum.* Madder.

Several inches in length. Quill to little finger in thickness. Externally of a reddish brown color, and a lingneous yellow portion within, which becomes red on drying. As usually found in commerce it is in the form of a coarse powder; this, when fresh; is of a light red, but when older, the color deepens. No odor. The fresh root is nearly tasteless; the old, aromatic and astringent taste. It is collected in the third summer, and then deprived of its epidermis. When used medicinally, it colors the bone red; this disappears on discontinuing its use. It contains five distinct coloring principles, the most interesting of which is alizarin.

STATICE. *S. Limonium.* Marsh Rosemary.

Grows along the sea coast. Large spindle-shaped, fleshy, compact, rough, and of a purplish brown color. No odor. Extreme astringent taste. About 17 per cent. of Tannin.

D. *Acrid.*

SENEGA. *Polygala Senega.* Seneka.

The only acrid, fleshy root devoid of starch. Generally very short, about three inches, then branching off into small filiform rootlets, making the entire length about six inches. The upper end is developed into a knotty crown, in some cases as much as an inch in diameter; this shows traces of the numerous stems, and is beset at the base with scaly rudimentary leaves of a purplish hue. Below this crown the thickness varies from that of a straw to the little finger. It is tapering, branched, and of a contorted or somewhat spiral form. The bark is pale yellow, translucent, horny, shrivelled, knotted and partially annulated, and contains the active principle. The bark encloses a pure white, inert, woody column about as thick as itself. There is no pith in the centre of the root. A characteristic mark is the projecting line running the entire length of the root, and appearing as if a thread was placed beneath the bark, and being attached at one end, was drawn to the other, giving the root a contorted appearance. Short, brittle fracture, a peculiar rancid odor, and a very acrid and sourish taste. An irritating dust is dispersed on handling. Senegin or Polygalic acid, as its principle is termed, has been obtained as high as 6 per cent.; it is closely analagous to Saponin, and, like it, is sternutatory. Dilute organic acids change it into Sapogenin and Glucose. The roots of Gillenia and Ginseng and the rhizome of Cypripedium are often mixed with it, but are readily distinguished.

E. *Bitter.*

GENTIANA. *G. lutea.* Gentian.

Habitates mountainous portions of Europe. The plant has a cylindrical, fleshy, simple root, of a pale color, often two feet in length by one and a half inches in thickness. It appears in commerce in irregular, contorted pieces, several inches in length and half to one inch in thickness; the pieces are generally sliced longitudinally, and are much wrinkled in the same direction, and marked transversely with numerous rings. Grayish brown externally; internally, of a more orange tint. Spongy, soft texture; feeble, peculiar odor; intensely bitter taste, without being nauseous. The root is tough and flexible, brittle only immediately after drying. On account of its porosity, it has been employed as a substitute for sponge tents. It is remarkable on account of the absence of Tannin, Starch and Oxalate of Calcium.

Its yellow color is due to Gentisic Acid, and its bitter taste to Gentiopicrin. The roots of several other species possessing similar properties are occasionally collected with it.

GENTIANA CATESBÆI. *G. Catesbæi.* Blue Gentian.

Branching, somewhat fleshy root, growing in grassy swamps of N. and S. Ca. Taste, odor and medical properties similar to Gentian Lutea. It is sometimes used to adulterate Seneka.

FRASERA. *F. Walteri.* American Columbo.

Long, spindle-shaped, horizontal, fleshy. In commerce, in transverse slices, irregularly circular, an eighth of an inch or more in thickness, and about an inch in diameter, somewhat shrunk in the middle, consists of a central medullary matter of a yellowish color, and an exterior cortical portion of a reddish brown. No odor—taste, first sweet, then bitter.

Distinguished from Columbo by the greater uniformity of its internal structure, the absence of concentric and radiating lines, *and its purer yellow color without the green tinge.* This, like the above, is devoid of Tannin and Starch.

F. *Mucilaginous and Sweetish.*

SYMPHYTUM. *S. officinale.* Comfrey.

Spindle-shaped branched, often more than an inch thick, and a foot long. Externally, smooth and blackish; internally, white, fleshy and juicy. By drying, becomes wrinkled, firm and horny, and of a darker color within. Inodorous, mucilaginous; feebly astringent taste. Contains large quantities of mucilage. Can be used for same purpose as Althea.

WITH STARCH.

G. *Resin Cells, Milk Juice, Aromatic.*

ASCLEPIAS TUBEROSA. *A. tuberosa.* Pleurisy Root.

Large, tuberous, sometimes fusiform, fleshy. Externally, (fresh) orange, (old) grayish. Internally, (fresh) white, (old) grayish; striated. No odor; somewhat sweet and acrid taste. Asclepin, its interesting principle, is obtained in the same manner as Digitalin.

ASCLEPIAS INCARNATA. *A. incarnata.* Flesh-colored Asclepias.

This grows in all parts of the United States. Its properties are similar to those of *A. Syriaca.*

ASCLEPIAS SYRIACA. Common Silk-weed.

A. Syriaca and A. cornuti.

This contains a peculiar crystalline principle, of a resinous character, closely allied to lactucone, and known as asclepione.

EUPHORBIA IPECACUANHA. Ipecacuanha Spurge.

E. Ipecacuanha.

Large and very long, almost perpendicular, sometimes penetrating six or seven feet in the sand, and from three-fourths to one and a half inches in diameter. When dry, is light and brittle, of a brownish color externally, white within; inodorous; sweetish taste. Its properties are due to a resinous matter.

EUPHORBIA COROLLATA. Large Flowering Spurge.

E. Corollata.

Almost perpendicular, generally about two feet long, and one inch thick. Externally, purplish-black; internally, white; medical virtues reside in cortical portion, which is thick, and constitutes two-thirds of the whole root. Inodorous; taste not unpleasant. Action of both uncertain as regards to time.

ANGELICA. *A. archangelica.* Angelica.

Long, somewhat tapering, and with four to six branches; in cultivated portions only two inches long, with forty to fifty branches. Dried is grayish-brown, and much wrinkled externally, whitish and spongy within, and breaks with a starchy fracture, showing shining, resinous points. Strong, aromatic, peculiar odor; taste sweetish. Odor due to Angelic Acid, which is closely allied to Valerianic Acid.

SUMBUL. *Euryangium Sumbul.* Musk-root.

This appears in commerce in transverse pieces, from two to five inches in diameter, and from one to one inch and a half in thickness, with a dusky, brown, wrinkled exterior, and an interior, porous structure, consisting of coarse, irregular, easily separable fibres. Musk-like odor; bitter, balsamic taste. It contains Sumbulic Acid. Medical properties similar to those of Valerian.

H. *Resin Cells, Aromatic.*

PANAX. *P. Quinquefolium.* Ginseng.

Fleshy, fusiform, from one to three inches long, thickness of the little finger, terminated by several slender fibres. Occasionally there are three or four portions connected at the upper end, and bearing a supposed resemblance to the human figure, from which the Chinese name, Ginseng, originated. Dried, yellowish-white and wrinkled externally; internally, consists of a hard central portion. Feeble odor; sweet, slightly aromatic taste. The N. Am. variety differs from the Chinese in having two branches, while the Chinese has four or more. It is scalded before being dried. Panaquilon is its interesting principle.

I. *No Resin Cells.*

1. Mucilaginous.

ALTHEA. *A. officinalis.* Marsh Mallow.

Perpendicular, cylindrical, from a foot to a foot and a half long, one half to one inch thick. The medicinal root is only collected from cultivated plants. In commerce, pieces three to four inches long, usually three-fourths of an inch thick, round or split, white and woolly externally, owing to the epidermis being removed, deeply furrowed lengthwise, and marked with brownish scars. White internally—light and easily broken with a short fracture. Inodorous; mucilaginous taste. Contains Starch (thirty per cent.), Mucilage, Sugar and Asparagin.

2. Acrid.

PHYTOLACCA. *P. decandra.* Poke Root.

Large, often five to six inches in diameter. In commerce, pieces of various sizes, cut in transverse and longitudinal slices. Light yellowish brown, much wrinkled externally, and shows in the transverse slices numerous concentric rings, formed by the projecting ends of fibres, between which the intervening matter has shrunk. Internally, the structure is firm (old) and almost ligneous, of yellowish-white color, alternating with dark, circular layers. Inodorous; acrid taste. Tannin, Resin.

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3. Bitter and Acrid.

BELLADONNA. *Atropia Belladonna.* Deadly Nightshade.

Indigenous to Europe, growing in shady localities. Beautiful flowers, of a purplish hue. Large, fleshy, tapering root, one to two inches thick, and about a foot in length, branched and fibrous. Externally, the fresh roots are of a dull brown, rough, with cracks and transverse ridges. The bark is thick and juicy, and, like the more central, fibrous portion, is internally of a dull, creamy white. A transverse section of the main root shows a distinct radiate structure. The dried root, as it appears in market, is in rough, irregular pieces, of a dirty grayish color, whitish internally, breaking easily with a short fracture. The structure of the main root and its branches differ, the former alone containing a distinct pith. This pith is included in a woody circle, crossed by narrow medullary rays. In the outer part of the woody circle, parenchymatous tissue is more prevalent than vascular bundles. The transverse section of the branches shows a central vascular bundle instead of a medullary column. The outer vascular bundles show no definite construction, and the medullary rays are not plainly discernible in the transverse section. The woody parts, both of the main root and branches, contain very large dotted vessels, accompanied by a prosenchymatous tissue. The cells of the latter are always thin walled; the absence of the proper tissue accounts for the easy fracture. Sometimes this tissue, in which the vessels are imbedded, assumes a brownish hue and a waxy appearance, and these parts are of a very irregular structure. In the cortical portion, many of the cells of the middle layer, and also some of the central parts, contain CaOx., but most of the cells are filled with starch granules. Sometimes mistaken for Althea, but from this it is distinguished by the *smoothness* of its outer layer, which in Althea is *woolly*, and also by the *wood bundles*, which are readily discernible in the former, not in the latter.

Narcotic odor; sweetish, sub-acrid taste. Should be collected from plants two years old. Contains two alkaloids—Atropia, (0.6 per cent.,) crystallizable; Belladonna, uncrystallizable, and a coloring matter, Atrosine. Commercial Atropia consists of both Atropia and Belladonna.

L. *Mucilaginous and Bitter.*

RUMEX. *R. crispus.* Yellow Dock.

Large, conical, tapering gradually. Externally, dark brown; whitish and somewhat mottled within, medullary rays plainly observed,—cortical portion most active,—inodorous, astringent, bitter taste. The cellular tissue is exactly like that of Rheum Rhaponticum, with the exception that it is not as much mottled, but its constituents are the same, Rumex containing not as much Chrysophanic Acid, but more Tannin.

RHEUM. *R. palmatum and other species.* Rhubarb.

This is obtained from several species, originally indigenous to S. E. Thibet and W. China. The so-called Russian or Crown Rhubarb, also known as Turkey Rhubarb, has become a thing of the past. The E. I. or China variety has gradually improved, and is now one of the best. Its cultivation extends over a vast area in China. The root is dug up at the beginning of autumn, cleaned, cortical portion removed, and then cut into pieces for drying. It consists of a large caudex, sometimes fifty pounds in weight, which branches; the caudex is only used; this appears in various forms. *China Rhubarb* consists of portions of a massive root which displays much diversity of form, arising from the various operations of paring, trimming, &c., to which they have been subjected; it is also often trimmed to imitate the old Russian Rhubarb. Thus some pieces are cylindrical, others conical, while a larger poportion are plano-convex, and others again are of no regular shape; but it is usually sorted in commerce into *round* and *flat Rhubarb.* It varies from three to six inches in length, and from two to three inches in width. The outer surface is somewhat shrivelled, often showing remains of the dark bark that has not been pared away. Many pieces are pierced with a hole, in which the cord used to suspend the root while drying may be found. It is also dusted over with a bright yellow powder, beneath which the outer side of the root is seen to have a rusty brown hue, or, viewed with a lens, to be marked by the medullary rays, which appear as innumerable short broken lines of deep brown, crossing a white ground.

The character which most readily distinguishes this Rhubarb is that well formed pieces, broken transversely, display dark lines, arranged as an internal ring of *star-like spots*. Although this is not obvious in every piece, it is of some utility, from the fact that in the European variety such spots are generally wholly wanting, or occur sparingly, and in an isolated manner. The tissue of Rhubarb is made up of a white parenchyma, brown medullary rays, and a few irregularly scattered very large fibro-vascular bundles, which are devoid of ligneous cells. On a transverse section of pieces, not too much peeled, a narrow, dark, cambial zone may be seen. In that part of the root only the medullary rays display the usual radial construction; no regular structure is met with in the interior of the root. There is no well marked pith. The central portion of the tissue shows a mixture of white parenchyma and brown medullary rays running in every direction. In full grown roots, the central part is separated from the cambial zone by the band of star-like spots already mentioned. The white cells are loaded either with starch or crystals of CaOx, the amount of the latter varying much. The medullary rays contain the substances peculiar to R.

The European variety (Rhapontic) is distinguished from the genuine by, 1st, the medullary rays, which, in the case of the genuine, are only regular immediately through the cambium line, while with the European they radiate from the centre, and are more or less regular. 2d, the stellate spots, (origin of leaves,) which are only apparent in the genuine; 3d, on the outside of the genuine are networks of vascular bundles, these are not discerned on the European; 4th, the grittiness (due to Oxalate Calcium), which the genuine has to a far greater extent; 5th, lively color, compactness; 6th, each piece of the genuine is perforated, the perforations reaching only to the centre; 7th, odor of the European less aromatic, and taste more mucilaginous and astringent.

Choice of Rhubarb; select the moderately heavy and compact, of a lively color; brittle, presenting, when broken, a fresh appearance, with reddish and yellowish veins intermingled with white, of an odor decidedly aromatic, of a bitter, astringent, not mucilaginous taste, feeling gritty, and staining the saliva yellow when chewed. Very light, rotten or worm-eaten, very heavy, &c., are inferior species. Chrysophanic Acid (also found in Rumex and Parmelia) is its most important approximate principle; this crystallizes in golden yellow needles or plates, soluble in alcohol and ether, and rendered dark red by alkalies; it agrees in composition with the Alizarin of Madder; Erythroretin, Phæoretin, Aporetin, Emodin, and Tannin (Rheo-tannic Acid) are also found in it.

CALUMBA. Columbo.

Jateorrhiza palmata. J. Calumba. Cocculus palmatus.

A climbing plant, indigenous to the E. coast of Africa, *Mozambique*, &c. This plant produces large, fusiform, fleshy roots, usually a cluster of four to six branches growing from a small head. The fresh root is externally rough and brown, and within, firm, fleshy, and of a bright yellow. In commerce it consists of transverse slices of irregular flattish pieces of a circular or oval outline, one to two inches in diameter, and one-eighth to one inch thick. In drying, the central portion contracts more than the outer; hence the pieces are depressed and thin in the centre. The outer edge is covered with a brown wrinkled layer, which covers a corky bark about three-eights of an inch thick, surrounding a pithless internal substance, from which it is separated by a fine, dark shaded line. The pieces are light and of a corky texture, easily breaking with a mealy fracture, of a dull greenish yellow color; this is rendered brighter by shaving the outer surface, or by washing. On a transverse section it shows a circle of radiate vascular bundles only in the layer closely connected with the cambial zone; they are much less visible in the cortical part. Weak, musty odor, very bitter and mucilaginous taste. Should be dug in March. Its bitter taste and medicinal properties are due to three substances, Columbin, Berberina and Columbic Acid. Contains no Tannin. It has been adulterated with white bryony and American Columbo.

Not Classified.

PETROSELINUM. *P. sativum.* Parsley.

Tapering root, four to eight inches long, thickness of the little finger. Externally, yellowish and marked with close annular wrinkles, thick bark; internally, white, medullary rays very irregular. Inodorous; sweetish, slightly aromatic taste. Apiol, its approximate principle, a yellowish, oily liquid, is used as a substitute for Quinia.

STILLINGIA. *S. sylvatica.* Queen's Delight.

Large, cylindrical, from one to two feet long, by about one inch in thickness. Externally, reddish brown and wrinkled. Within, a yellowish, ligneous portion, surrounded by a pinkish colored bark. Shrinks much on drying. When fresh, of a disagreeable odor, but little odor when dry. Acrid taste. Constituents not isolated.

WOODY ROOTS, WITH STARCH.

1. *Sweet and Mucilaginous.*

GLYCYRRHIZA. *G. glabra.* Licorice.

The root is dug up in winter, when the plant is at least three years old; the latter has a crown dividing into several aerial stems; below this crown is a principal root about six inches long, which divides into three to five long, rather straight roots, beset with rootlets. Besides these downward running roots, the principal root emits horizontal runners, which also help to contribute to the commercial article. It appears in commerce in pieces of various lengths and thickness, round and fibrous. Externally, yellowish brown and wrinkled, appearing either with or without the thin brownish coat; internally, grayish yellow. The bark consists of about one-fourth of the diameter of the root. Both the bark and wood are extremely tough, readily tearing into long fibrous strips. The corky layer is made up of the usual tubular cells; the primary cortical tissue of only a few rows of cells. The chief portion of the bark consists of liber, and is mostly built up of parenchymatous tissue accompanied by elongated fibres of two kinds, partially united and partly forming a network. The woody column shows three kinds of cells, ligneous, with oblique ends; parenchymatous, almost cubic; and large pitted vessels. The bark and wood are separated by a very distinct cambial line. Peculiar earthy odor. Strongly sweet and mucilaginous taste. Glycyrrhizin, its peculiar principle, is a glucoside, splitting into glycyrretin and glucose by the action of dilute muriatic acid. Asparagin has also been obtained.

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2. *Astringent.*

KRAMERIA. *K. triandra.* Rhatany.

Shrubby plant of a striking appearance, indigenous to the sandy localities of S. Am. The root, which attains considerable size, consists of a short, thick crown, sometimes much knotted, and as large as a man's fist. This branches, throwing out numerous branching cylindrical roots, some feet long and one-fourth to one-half inch thick. In commerce, the more woody central part with the short stumpy branches constitutes the largest proportion. The bark, which is scaly and rugged, and one-tenth to one-twentieth of an inch in thickness, is of a dark reddish brown, and contains the medicinal qualities. It consists of a loose, cracked, corky layer, mostly smooth in the smaller roots, covering a bright brownish red inner bark, which is readily separated from the brownish yellow wood. The bark is tough, breaking with a fibrous fracture. The wood is dense, without pith, but marked with concentric rings and fine, dark medullary rays. Liber constitutes the chief portion of the bark; a transverse section shows numerous bundles of yellow fibres separated by parenchymatous tissue, and crossed by narrow, brown medullary rays. The wood exhibits no particular structure. No odor; the taste of the bark is purely astringent; the wood is almost tasteless. In the other varieties of R. the bark adheres more firmly to the wood, the fracture is more abrupt and less fibrous, the crown is not so knotty nor the roots so long or black, the color is of a dull purplish brown, the taste more astringent. Rhatania-tannic acid, closely related to Catechu-tannic acid, and an alkaloid, Tyrosina, (also of animal origin,) are its interesting principles.

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3. *Bitter and Acrid.*

PAREIRA BRAVA. *Chondodendron tomentosum.* Pareira Brava.

Long, twining, cylindrical root, from the thickness of a finger to that of the arm, and from a few inches to several feet in length. Externally, blackish brown, somewhat firmly adhering bark, which is disposed to exfoliate, marked with longitudinal and irregular wrinkles, and occasionally with large warts. Internally, light yellowish brown, sometimes of a dull greenish brown. The root hard, but easily shaved, which transversely exposes a waxy surface, rather than woody, when cut.

Transverse sections display three or four zones, divided from each other by wavy, light-colored lines; crossing these zones are wedge-shaped, woody rays, sparsely and irregularly distributed. The central column is 0.2 to 0.4 of an in. in diameter, and is composed of ten to twenty converging wedges of large pored woody tissue.

STEMS AND ROOTS OF CISSAMPELOS PAREIRA are very commonly sold as true Pareira; indeed, this was supposed to be the source of true Pareira. May be distinguished by there being no concentric layers of wood, thickish, corky bark. The transverse sections shows a light brown wood, composed of a number of converging wedges (ten to twenty) of very porous structure, separated by narrow medullary rays. Bitter taste, without sweetness or astringency.

COMMON OR FALSE PAREIRA BRAVA. Source uncertain; pieces cylindrical, four-sided or flattened; transverse section remarkable, a well defined pith in centre of first formed wood, succeeded by ten to fifteen or more eccentric—seldom concentric—zones, one tenth to two-tenths of an inch in width, each separated from its neighbor by a layer of parenchyma, the outermost being coated with true bark. Sometimes the zones are formed entirely on one side. They are crossed by numerous small medullary rays. These do not run from the centre to circumference, but traverse only their respective zones, on the outside of which they are arched together. An alkaloid (Pelosina) identical in composition with Buxina is found.

IPECACUANHA. *Cephælis Ipecacuanha.* Ipecac.

The stem creeps a little below the surface of the soil, emitting a small number of slightly branched, contorted roots, a few inches long. When young, these roots are very slender and thread-like, but grow gradually knotty, and become, by degrees, invested with a thick bark, transversely corrugated or ringed. Close examination of the dry root shows that the bark is raised in narrow, warty ridges, which sometimes run entirely round the root, sometimes encircle only half its circumference. The rings number about twenty to the inch, not unfrequently deep enough to penetrate the wood. The whole surface is wrinkled longitudinally. It appears in pieces of about two inches in length and three lines in diameter. The woody centre is scarcely half a line in diameter, sub-cylindrical, sometimes striated, and devoid of pith. Externally the color varies from a dusky gray to black. It is hard, breaks short and granular (not fibrous), exhibiting a resinous, waxy, or farinaceous interior, white or grayish. The interior cortical tissue is uniform, in which the medullary rays are scarcely to be observed. In the woody column they are obvious; the prevailing tissue consists of short pitted vessels. The bark, which constitutes about 75 per cent. of the entire root, and contains all the medicinal properties, may be easily separated from the porous wood. When whole, it has but little smell; but when powdered, its odor is nauseous, taste bitter and nauseous. The wood is almost tasteless. The Carthagena or New Granada Ipecac differs from the Brazilian chiefly in being of larger size. The former, moreover, has a distinct radiate arrangement of the wood, due to the greater development of the medullary rays, and is less annulated. The peculiar principles of Ipecac are *Emetia and Ipecacuanhic Acid.* The activity of the drug is solely due to the Emetia, which it yields to the extent of 1 per cent. Ipecacuanhic Acid is related to Caffeo-tannic and Kinic Acids.

GILLENIA TRIFOLIATA. Gillenia.

G. trifoliata and G. stipulaceæ

Are distinguished among themselves by the stipules of the latter being much larger, and its root darker, thicker, and more annulated.

They appear in commerce in pieces about the thickness of a quill, and several inches in length. Externally, red brown, wrinkled longitudinally, somewhat knotty appearance, bark thick, brittle, and easily separated; it contains the medical virtues. Internally, pale brown, wood tough and of a white color, and inert. Inodorous. Bitter, acrid taste. Contains Gillenin.

TRIOSTEUM. *T. perfoliatum.* Fever Root.

Long, horizontal, about three-fourths of an inch in diameter. Brittle. Externally, brown; internally, white. Inodorous. Bitter, nauseous taste.

APOCYNUM ANDROSAEMIFOLIUM. Dogsbane.
A. androsaemifolium.

Several inches long, by one-fourth to one-half of an inch thick. Externally, brown, and longitudinally wrinkled. Internally, whitish. No odor. Bitter taste.

APOCYNUM CANNABINUM. *A. cannabĭnum.* Indian Hemp.

Very long horizontal root, about one-third of an inch thick. Externally, yellowish brown; internally, yellowish white. Breaks with a short fracture. Peculiar odor. Nauseous, somewhat acrid taste. Contains Apocynin.

Aromatic.

GELSEMIUM. *G. sempervirens.* Yellow Jasmine.

Long, spreading root, generally mixed with the overground stems. As found in commerce, sliced in cylindrical pieces, an inch or more in length, a half to an inch thick, very light and fibrous. Externally, grayish brown; internally, white; bark thin, medullary rays plainly observed; slight odor; lasting, bitter taste. Gelseminic Acid (analagous to Esculin, found in horse chestnut) and Gelseminia are its important principles.

RHIZOMES.

ACOTYLEDONOUS.

FILIX MAS. *Aspidium Filix Mas.* Male Fern.

The whole rhizome is about a foot in length, one to two inches thick, fleshy when fresh. Found in commerce in fragments; light, spongy, flexible. Externally, brown; internally, greenish, inclining to cinnamon shade, furnished with large vascular bundles interruptedly arranged in a ring. The rhizomes are closely enveloped on their whole outer surface by the residue or base of the foot-stalks (of the fronds) and numerous chaff-like scales. The former arise obliquely, and point in one direction; these, together with the scales, distinguish them from other similar rhizomes. Sweetish-bitter taste. Odor peculiar, somewhat nauseous—only such as have retained their green color are considered of value in medicine. Constituents, five to six per cent. of green, fatty oil, traces of Vol. Oil, Resin, Tannin, Filicic Acid, &c.

ASPIDIUM AUTUMNALE (the one indigenous) is distinguished by having four wood bundles, while A. Filix Mas has six to eight, and longer ones.

MONOCOTYLEDONOUS.

COLLECTED WITHOUT ROOTLETS.

Horizontal, Acrid.

IRIS VERSICOLOR. *I. versicolor.* *Blue Flag.*

Fibrous; cut when fresh in slices. Differs from I. Florentina in the annulations being more prominent. Externally, brown; internally, whitish. No odor. Slightly acrid taste.

Horizontal, of Violet Odor.

IRIS FLORENTINA. *I. Florentina.* Orris Root.

Pieces of various forms, somewhat flattened, gradually widens to about an inch, from three to five inches long, knotty, decorticated, marked with small circular scars on the lower surface, where the rootlets have been cut off. They are often mixed with club-shaped branches. (I. GERMANICA and I. PALLIDA furnish the larger portion of commerce.) Internally, yellowish white. Aromatic odor and taste. Contains a solid crystalline substance called Orris Camphor. Vol. Oil.

Horizontal, Aromatic, Bitter.

CALAMUS. *Acorus Calamus.* Sweet Flag.

Whole rhizome is several feet in length, from half to one inch in diameter, flattened, closely annulated, marked with scars on the under surface, where the rootlets have been cut off, whitish externally, and has spongy structure, owing to its very numerous air-passages. It has a strong, peculiar odor, and a bitter taste, fracture short and rough, contains a large number of oil-cells, (the unpeeled richest in Vol. Oil.) The peeled rhizome only used in medicine; gathered late in fall. Contains 1.3 per cent. of Vol. Oil. Bitter principle, Acorin.

Horizontal, Aromatic, Pungent.

CURCUMA, *C. longa.* Turmeric.

Two to four inches long, one inch in diameter, contorted; externally, yellowish gray; internally, deep orange-yellow, provided with a darkish ring; hard, compact, breaks with a waxy fracture; slight odor; aromatic, pungent taste. C. longa and C. rotunda are from the same branch. Egg-shaped at first, then cylindrical; feeble, ginger-like odor; burning, bitterish taste. The solution of the coloring principle (Curcumin), which is yellow, changes by alkalies to brown, becoming violet on drying. Boracic Acid produces an orange tint, turning blue by an alkaline solution.

ZINGIBER. *Z. officinale.* Ginger.

The rhizome is compact, heavy, shortly branched or lobed, flattened, one to four in. long. The entire surface is deprived of its dark ash-colored epidermis by scraping, and then bleached. This furnishes the Jamaica variety. (Very white ginger bleached with lime and other chemical means should be rejected.) Internally, of a pale yellowish or whitish color, with a darker ring under the bark, and provided with small, very numerous resiniferous receptacles. It has a somewhat fibrous fracture and is farinaceous. The black variety has its dark ash-colored epidermis remaining. Contains Vol. Oil (one-fourth per cent.) and Resin, to which the burning taste is due.

GALANGA. *Alpinia officinarum.* China Root.

Three to four inches long, much branched, one-half to one inch in diameter. Externally, reddish brown; internally, orange brown, marked with white circular rings; hard, fibrous; aromatic odor; aromatic, pungent taste.

Cut in disks, Pungent.

ZEDOARA. *Curcuma Zedoaria.* Zedoary.

A variety of Curcuma. Cut in small transverse slices; compact, tough; pale grayish brown color, and provided with small resiniferous glands; causes burning in the mouth when chewed.

Upright, Sternutatory, Bitter.

VERATRUM ALBUM. *V. album.* White Hellebore.

One to three inches long, by one inch or less in diameter, cylindrical, wrinkled and rough, from the remnants of the fibrous rootlets. Externally, of a dark brown; internally, yellowish, nearly colorless; a transverse section shows a broad, white ring, surrounding a spongy, pale buff, central portion. Comes in longitudinal slices, sub-conical, of a dull, earthy black, very rough in its lower half, with the pits and scars of old roots more or less beset above with the remains of recent roots. The top is crowned with the bases of the leaves, the outer of which are coarsely fibrous; taste, sweetish-bitter, leaving on the tongue a sensation of tingling, acrid. Contains Jervia and Veratridia.

COLLECTED WITH ROOTLETS.

Upright, Sternutatory.

VERATRUM VIRIDE. *V. viride.* American Hellebore.

One to two inches long, less than an inch in diameter, tapering, wrinkled, beset with numerous rootlets, often several inches long, compact, but light in color; externally, dark brown; internally, dingy white. In commerce, whole or in longitudinal slices; inodorous; bitter, acrid taste. In form, internal structure and taste, resembles V. Alb., only distinguished by its rootlets being attached, while those of V. Alb. are always detached. Principal constituents, Jervia and Veratridia.

Upright, taste Biting.

DRACONTIUM. Skunk cabbage.

D. fœtidum, Ictodes fœtidus, Symplocarpus fœtida.

Three to four inches long, about an inch thick. Externally, dark brown, rough from the remains of the radicles; internally, white and amylaceous. In commerce whole, or in transverse slices, and occasionally the separated radicles. These are lighter in color than the rhizome. Fresh, peculiar, disagreeable odor. When dry, loses this to a great degree. Acrid taste.

Horizontal, Stem Scars Cup-shaped.

CYPRIPEDIUM. *C. pubescens. C. parviflorum.* Lady Slipper.

Maximum length four inches, slightly bent, one-eighth to three-sixteenth inches thick; numerous deeply concave scars, as wide as the rhizome; numerous rootlets, several inches in length, attached to rhizome on all sides. Externally, dark brown; internally, yellowish white. Aromatic odor; bitter, pungent taste. Contains Vol. Oil, Tannic and Gallic Acids, Resin, &c.

DICOTYLEDONOUS.

COLLECTED WITH FEW OR NO ROOTLETS.

Short, Horizontal, Red Resin Cells.

SANGUINARIA. *S. Canadensis.* Blood Root.

From one to three inches in length, and one-fourth to half of an inch thick. Externally, blackish-red brown, with abrupt bends, and sometimes short fibres; internally, spongy, red, with white spots; bark thin; large, central pith, containing starch and red resin cells. faint odor; bitterish, acrid taste. Contains Sanguinaric Acid and Sanguinarina, which are colorless; its salts are blood red.

Short, Horizontal, Astringent.

GERANIUM. *G. maculatum.* Cranesbill.

From one to three inches long, and a quarter to a half inch thick; flattened, contorted, wrinkled, annulated, and sometimes beset with short fibres. Externally, gray brown, thin bark; internally, distinct brown; pith large; many wood bundles near cambium line; breaks with a short fracture; inodorous; astringent taste. Contains about 18 per cent. of Tannin.

Short, Upright.

TORMENTILLA. *Potentilla Tormentilla.* Tormentil.

Cylindrical, rather broader at top, and tapering. From one to two inches long, and about half an inch thick; knotty, somewhat contorted. Externally, brownish;. internally, brown; thin bark; inodorous; astringent taste. Differs from Geranium in having from four to six large wood bundles, while Geranium has many but small. Contains about 20 per cent. of Tannin.

Short, Bent Double.

BISTORTA. *Polygonum Bistorta.* Bistort.

Cylindrical, somewhat flattened. One to two inches long, and from a fourth to a half inch thick; marked with annular transverse wrinkles, and folded or bent upon itself so as to give it a tortuous appearance. Externally, deep brown; internally, reddish brown; inodorous; astringent taste; bark thicker than bark of Geranium. Contains about 18 per cent. of Tannin.

Long, Thickened Joints.

PODOPHYLLUM. *P. peltatum.* May Apple.

Whole rhizome is horizontal, one to several feet in length, and about a quarter of an inch thick, jointed and furnished with radicles. In commerce, consists of pieces two to three inches long, and sometimes furnished with fibres. The leaf scars are plainly visible, and are far apart, except in the thickened portion, where they are close together; broad, flattened joints at short intervals. Externally, orange brown, short fracture; internally, whitish, showing an extremely small, corky layer, and a thin, simple circle of about twenty to forty yellow vascular bundles, enclosing a central pith, which, in the larger pieces, is about two lines in diameter.

Podophyllum contains no alkaloid. The yellow coloring principle heretofore supposed to be due to Berberina is due to the resins, one of which is soluble in ether, and the other insoluble in the same liquid. Podophyllinic acid, which has a chemical behavior analogous to Quercitron, is said to be also a constituent.

COLLECTED WITH ROOTLETS.

Bright Yellow, Long, Thin, Woody.

XANTHORRHIZA. *X. apiifolia.* Yellow Root.

Whole rhizome, nearly cylindrical, from three inches to more than a foot in length, and about a fourth of an inch thick. In commerce, in slender pieces of various lengths; wrinkled longitudinally; externally, yellowish brown; bark easily separated; internally, a thick, hard, bright yellow cortical portion, and a very slender central pith; inodorous; bitter taste, without astringency. Yields an alkaloid identical with Berberina.

Bright Yellow Branches Short, Fleshy.

HYDRASTIS. *H. Canadensis.* Golden Seal.

Horizontal, knotty appearance; branches curved upward; contorted, very rough and wrinkled, hard and brittle. From an inch to two or more in length about a fourth of an inch thick; beset with numerous slender rootlets, or showing marks where they have been. Externally, dark brown; internally, yellow; breaks with a short fracture; inodorous; bitter taste, without astringency. Contains Hydrastia and Berberina.

Brown, Upright, Short.

VALERIANA. *V. officinalis.* Valerian.

From one-fourth to three inches in length, surrounded by a large number of rootlets. The two varieties (growing in moist and dry localities) differ in the dry being smaller, (nearly globular,) rootlets, thinner, and of a lighter color and less shrivelled than the variety growing in moist localities; the dry also contains a larger proportion of the volatile oil. Externally, brown, beset with long, slender, cylindrical rootlets, which, when broken transversely, display a dark epidermis, forming a part of thick white bark, which surrounds a slender woody column; wood wedges near cambium line, separated by medullary rays; taste strong, disagreeable; peculiar camphor-like odor, developed by drying and exposure. Contains Vol. Oil, one-half to two per cent. Valerianic acid is developed in the rhizome by exposure. The oil obtained from the dry root is admixed with this acid. Borneene, Valerol, and a camphor identical with Borneo Camphor are also present.

Brown.

GEUM. *G. rivale.* Water Avens.

From four to six inches long, and one-fourth to one-half of an inch thick; jointed, scaly, tapering, and furnished with numerous descending yellowish fibres, hard and brittle. Externally, dark brown; internally, yellowish brown; breaks with a short fracture; thin bark, large wood wedges, separated by narrow medullary rays, enclosing a large pith; clove-like odor; bitterish, astringent taste. Contains Gein—analagous to Tannin.

Brown, Stem Scars in Rows.

SERPENTARIA. Virginia Snake Root.
Aristolochia Serpentaria. A. reticulata.

From two to three inches long, and one-sixth to one-eighth of an inch thick; contorted, bent up and down. Externally, light grayish brown, with numerous long, slender fibres attached; internally, grayish, closely mottled; thin bark; woody zone quite large, in distinct wedges of a white color, and separated by medullary rays; wood bundles not regular—*longer on one side.* Rootlets have thick bark. *The rhizome bears on its upper surface short bases of stems of previous years.* Peculiar aromatic odor, resembling Valerian, but less unpleasant; camphoraceous taste. (Under the microscope the rootlets exhibit a central fibro-vascular bundle, surrounded by a nucleus sheath.) Contains Vol. Oil, one-half per cent., Resin, one-half per cent., and small quantity of Tannin. Bitter principle, Aristolochin.

Brown, Horizontal, Scars Deeply Connected.

SPIGELIA. *S. Marilandica.* Pink Root.

This consists of numerous slender, branching, crooked, wrinkled fibres, from three to six inches long, attached to a small, knotty head. Externally, brownish; internally, whitish. (In Spigelia, the stems attached to the rhizome are *close together,* these overground stems die *quite* to the ground; the pith is larger than that of Serpentaria; the stems of the latter are attached to the rhizome *farther apart,* and the overground stems die *nearly* down to the ground.) Peculiar odor, different from that of Serpentaria; taste, slightly bitter, acrid. (The nucleus sheath observable in Serpentaria is wanting in Spigelia.) Composition not satisfactorily known; the wood contains resin and starch; the cortical part of the rhizome contains Tannic matter, but not the roots.

Brown Two Edged, Four Angled.

ASARUM. *A. Canadense.* Wild Ginger.

Long, creeping rhizome, more or less contorted. In commerce in pieces four to six inches long, and thickness of a straw to a goose quill. Externally, brownish, wrinkled, furnished with short fibres (easily broken), quadrangular, two-edged leaf scars, plainly visible in fresh; internally, nearly white, small wood bundles, surrounding a large pith ; peculiar aromatic odor ; taste, aromatic and warm. Contains a light colored pungent and fragrant Vol. Oil., acrid resin, starch, gum, &c.

Black, Knotty, Branched, Ascending, Thin.

HELLEBORUS. *H. niger.* Black Hellebore.

Collected from wild plants. From one to two inches in length, many headed, a half inch thick or less. Externally, blackish, many short branches, about the thickness of a straw, smooth and brittle; leaf scars not distinct on rhizome, but distinct and close together on the branches; internally, grayish, thick bark, wood plainly visible and of a yellow color, eight to twelve white wood wedges, rather long and broad, separated by medullary rays, which enclose a large pith. Rootlets break easily and are generally found detached. The younger roots when broken exhibit a thick bark, encircling a simple woody cord; in the older this cord tends to divide into converging wedges, which present a stellate appearance, but not so distinctly as in Actæa. H. Viride smaller, and only four wood bundles. Odor, slightly like Senega; taste, bitter, slightly acrid. Contains Helleborin, which produces a tingling sensation on the tongue, and is said to be highly narcotic. It is a glucoside.

Black, Knotty, Branched, Ascending, Thick.

CIMICIFUGA. *C. racemosa.* Black Snake Root.

Thick, irregularly bent or contorted caudex; from one-third to an inch thick, and very short, knotty, branching, somewhat flattened ; furnished with many slender radicles, and made very rough and jagged in appearance by the remains of stems. It is also marked at intervals with the scars of fallen leaves; wiry-roots one-twentieth to one-tenth of an inch in diameter, emitting rootlets still smaller. When broken, a transverse section displays a horny, whitish pith, around which are numbers of rather coarse, irregular woody rays, and outside them a hard, thickish bark. The larger roots, when broken, display a thick, cortical layer, the space within which contains converging wedges of open, woody tissue, three to five in number, forming a star or cross ; beautiful structure observable with lens; color, dark, blackish brown; taste, bitter, acrid, astringent; odor, narcotic. Contains gum, resin, sugar, starch, and tannic acid; the resin, precipitated from strong alcoholic solution by throwing into water amounts to about 3½ per cent.; called Cimifugin or Macrotin.

Black, Horizontal, Knotty, Branched.

LEPTANDRA. *L. Virginica.* Culvers Root.

From four to six inches in length, two to four lines in thickness; variously branched; nearly cylindrical; somewhat flattened and tuberculated; many rootlets which break off easily; very hard and firm, and of difficult fracture; externally, blackish; internally, whitish; thin bark; central portion nearly black; the pith generally wanting; wood whitish and thick, and enclosing (when there is any) a pith about the same size; few medullary rays; the central part has a pentagonal or hexagonal appearance; inodorous; taste bitter and acrid. Contains Vol. Oil, Resin, Gum and Leptandrin; to the latter, the virtues are ascribed.

TUBERS.

MONOCOTYLEDONOUS.

A. *Bitter.*

COLCHICUM. *C. autumnale.* Meadow Saffron.

Tuber (corm, so called) surrounded by scales (brown,); roots borne at the base. Fresh corm is inversely pear-shaped, two inches long by an inch or more wide; rounded on one side, flattish on the other. Appears in commerce in transverse slices one-eighth of an inch thick, with a notch at one part of the circumference; both sides nearly white (should not be mouldy or stained), circumference brown; brittle; inodorous; bitterish taste; abounds in starch.

DEVELOPMENT.—A rudimentary corm, borne on the flattened upper side of the old corm. Produces, first year, a flower stem; second year, fruit stem and leaves. After these have come to maturity full development is acquired; this is at the expense of the parent corm, which gradually shrivels and ultimately decays.

Collected between the time of the withering of the leaves and the sprouting of the flower; in drying they lose about 70 per cent. of water. Contains Colchicia in very small proportion, only about 0.05 per cent.

B. *Acrid.*

ARUM. *A. triphyllum.* Indian Turnip.

Depressed, globose; lower portion wrinkled; color, externally, brown; internally white; in recent state, highly acrid; the acrid principle volatile, driven off by heat; by drying, loses nearly all its acrimony, and becomes quite inert; occurs in commerce in transverse slices, circular, nearly an inch in diameter Contains starch, gum, albumen, &c.

C. *Insipid.*

SALEP. *Orchis mascula and other species.* Salep.

About one inch in length, half inch thick; translucent; horny, shrivelled appearance; internally, whitish and spongy; feeble odor; mild, mucilaginous taste. The most important constituent is a sort of mucilage (about 48 per cent.) which is turned blue by Iodine. It forms, with forty parts of water, a thick jelly. A small proportion of starch in the composition of this mucilage is partly the cause of this formation of jelly.

DICOTYLEDONOUS.

A. *Resin Cells in Circles.*

JALAPA. *Exogonium purga. Ipomea Jalapa.* Jalap.

Globular, pear shaped, sometimes elongated, forming secondary tubers; externally, brown, smoky (due to the manner in which it is dried), round and thick warts. When broken, shows a thin cortical portion, and near the cambium line a large number of resin cells. Outside the cambium line these resin cells form distinct zones, which are regular and alternate. Between these prominent zones, are smaller ones of resin cells; peculiar odor, partly due to the manner of drying; taste, sweetish, and afterwards slightly acrid. The false Jalaps are destitute of concentric zones, and are whiter in appearance. Its activity is due to resin—12 to 18 per cent.—in crude state; purgative principle, Jalapin (Convolvulin), insoluble in ether, soluble in fixed alkalies, not re-precipitated by acids. Contains also starch, sugar, gum, &c.

B. *No Resin Cells.*

ACONITUM. *A. Napellus.* Monkshood.

Spindle shape, tapering, about the thickness of finger at top; length one to three inches. Produces a lateral branch at top, the terminal tuber is enlarged, and produces a second tuber, which are joined together; the older is dark brown, and supports the stem; the younger is light yellowish brown, and furnishes the stem of the following year, the old tuber decaying. Externally, dark brown, stem scars or terminal buds visible, longitudinally wrinkled at lower portion and tuberculated at upper part; few rootlets, not attached in commerce; breaks with a short fracture; internally, white or grayish, tissue sometimes spongy or resinous; transverse section shows thick bark, pith in form of a star, five to eight medullary rays, small wood bundles, sharp and long; inodorous; taste bitter, tingling sensation to tongue; collected after flowering. Adulterated with Masterwort root (*Imperatoria ostruthium*) doubtless by accidental or careless collection; this is less tapering, slightly compressed, and exhibits several warty zones indicating periods of growth. The central portion is of a yellowish white color, and exhibits a more or less complete ring of brownish dots; with the aid of a lens, elongated dots of paler color are seen next the bark; these are oil receptacles—not seen in Aconite. Aconite contains Aconitia, *crystalline and amorphous;* Aconella, *identical with Narcotina*, resin, fat, mannite, &c.

BULBS.

A. *Tunicated, Simple.*

SCILLA. *S. maritima.* Squill.

The fresh bulb is pear-shaped, varies in size, occasionally four to five pounds. When collected, the outer scales are removed, the inner ones only employed. The central scales are also rejected, being too fleshy and mucilaginous. These are cut longitudinally and dried, loosing four-fifths of their weight in drying. In commerce, two kinds, red and white, the medicinal qualities of which are the same; differ only in their color, the former being reddish brown externally and rose color internally. All parts of the latter are white. The dried squills are in irregular oblong pieces, more or less contorted, color varying from white to reddish tinge, brittle and pulverizable, but soon attracts moisture and becomes flexible; strong affinity for water; feeble odor; bitter, nauseous, acrid taste, and abounds in mucilage, precipitated by the neutral acetate of lead. Scillitin, (said to be the bitter principle), contains also oxalate of calcium, in extremely sharp, minute, brittle crystals. To these latter is attributed the effect formerly attributed to a volatile acrid principle of occasioning an itching and redness when rubbing a slice of squill on the skin.

B. *Tunicated, Compound.*

ALLIUM. *A. sativum.* Garlic.

Compound bulb; disk-like axis; rootlets on lower side; bulbets kept apart by fine membrane; short axis, closely surrounded by leaves; cloves, usually five to six in number, of oblong shape, somewhat curved, and in their interior whitish, moist, or fleshy; disagreeable, pungent odor, (due to its volatile oil;) bitter, acrid, taste. The Allium of commerce is a cross between A. sativum and A. Porrum. Contains Volatile Oil, (sulphuretted) Mucilâge, albumen, &c.

STEMS.

A. *Twigs of Half Shrubs.*

DULCAMARA. *Solanum Dulcamara.* Bitter Sweet.

Shrub, six to ten feet high—not upright, but climbing. Branches collected late in autumn, and the extreme twigs selected. Appears in commerce cut up in very small cylindrical pieces one-eighth inch or more in diameter; externally, longitudinally striated; thin, greenish brown epidermis, and underneath of a uniform green color; internally, wood white, with greenish spots surrounding central pith, which is usually hollow; inodorous; taste, bitter-sweet. Contains Solania, supposed to exist combined with Malic Acid. The taste said to be due to a peculiar principle called *picroglycion;* also, resin, wax, &c.

WOODS.

1.—WITHOUT ANNUAL RINGS.

A. *Bitter, White.*

QUASSIA. *Simaruba Excelsa.* Quassia.

Large, lofty tree; wood appears either in large, round billets, or rasped; dissected by fine, medullary rays; ducts are rather large; fresh, white; yellow by exposure; inodorous; persistent, bitter taste. Contains Quassin (*bitter principle,*) 0-1 per cent.

Brown, Green, Rather Acrid.

GUAIACUM. *G. officinale.* Lignum Vitæ.

Large tree, of which the heart wood is employed. This comes in billets, or most generally, in raspings or shavings. Dark brown color, but when exposed to air brownish green. The wood is very heavy, owing to the large amount of resin it contains, which completely fills its cells. Medullary rays obvious, but very fine; wood fibres never run straight, but are interlaced in various ways; slight odor, more apparent when heated; little taste. The wood assumes a peculiar blue color when brought in contact with any oxidizing agent. The only constituent of interest is the resin, of which the heart wood contains about twenty-five per cent.

C. *Dark Red, Astringent.*

HÆMATOXYLON. *H. Campechianum.* Logwood.

Medium sized tree, heart wood used, this is of a deep red color, but assumes a blue color when exposed to air, due to Hæmatoxylin. Appears in logs and chips; heavy concentric rings, dark and light, no annual rings, but distinct layers; inordorous, distinct sweet taste, (due to Hæmatoxylin).

An Alkali poured upon a solution of Logwood, turns it a purple color.
" " " " " Brazil wood, " red "
" " " " " Santalum, no effect.

D. *Dark Red, Scarcely Astringent.*

SANTALUM. *Pterocarpus Santalinus.* Red Saunders.

Large tree; billets or rasped, blood red color, brown by exposure, inodorous and nearly tasteless. Coloring (resinous) principle. Santalin.

E. *Yellowish, Fragrant,*

SANTALUM ALBUM. *S. Album, et citrinum.* Sandal Wood.

Billets, four to six inches in diameter, varies in color, fragrant odor, best perceived when in powder, little taste. The Vol. Oil is obtained from a variety of yellow sandal wood, the product of S. Myrtifolium.

BARKS.

1. ASTRINGENT AND BITTER.

Bast Fibres, Single, in Short Lines, or Small Groups.

CINCHONA.

The dehiscence of the capsule from the base toward the apex, or from below upwards, characterizes this genus, and distinguishes it from the genera Cascarilla, Exostemma and Buena. The property of curing ague belongs to the barks of all the C. with hairy and woolly blossoms, and to these alone. (Humboldt.) All those with smooth corollas belong to the genus Cascarilla of Weddell.

CINCHONA AS A CLASS.

Bast fibres, very short and blunt, acutely pointed at both ends, and the cavity destroyed by secondary deposits; either entirely separate, or occur in groups of two to three, or in rows of one to two, forming radial lines more or less obstructed. Primary layer composed of parenchyma; some have laticiferous vessels separating primary layer from bast fibres; also cell walls more or less thickened, and occasionally filled with resin or crystals. The outer layer is invariably corky, (but the C. barks have the epidermis only when green; no true epidermis found on the C. barks of commerce,)and penetrates deeply, in some cases obliterating these milk vessels; this is especially the case with old barks, and nearly always with C. Calisaya. The internal color of the young barks are usually lighter than those of the old; color is no criterion of the bark.

In some C., (Pahudiana-non-off.) although the bast fibres resemble the genuine, they are closely and regularly arranged, and the inner surface is invariably more or less striated. The inference is, that Quinia is most largely developed in those barks in which the fibres are short and intimately mixed with cells, while Cinchonia is more especially deposited in the tissues exclusively cellular. The fracture in the former variety is from its structure fibrous, but short fibrous throughout. That of the latter is smooth, where cells exist exclusively, and with long fibres where fibres exist. A short, smooth fracture, therefore, as in the young barks, or a fracture partly smooth and partly long fibrous, as in the older barks, which have not thrown off their cellular layer, indicates a Cinchonia bark, and one comparatively feeble; while a fracture uniformly short fibrous, indicates a variety abounding in Quinia and energetic; and in proportion as a bark approaches this latter condition, will it prove to be efficacious.

When a piece of Cinchona is heated in a test tube, a red liquid appears among the vapors given off (Grahe's test.)

CINCHONA FLAVA. *C. Calisaya.* Yellow Cinchona.

QUILL.—One fourth to three inches in diameter, three inches to two feet long, and of equally variable thickness. Externally, brown, covered or diversified by grayish lichens, marked with transverse fissures, which are about an inch apart, and these are crossed by longitudinal fissures, which are also about an inch apart; these fissures go through the bark. The cork is easily removed; the corky layer is inert. Short, fibrous texture; compact, and when broken, presents shining points, apparently the termination of small fibres, running longitudinally, which, examined by the microscope, are found to be (freed from the powder that surrounds them,) yellow and transparent. These separate in the form of spicula, when the bark is powdered. Internal color, cinnamon yellow, somewhat striated; faint odor, but when boiled, resembles that of the pale varieties. The small quills closely resemble some of the pale barks, but may be distinguished by their very bitter taste.

FLAT.—Five to eighteen inches in length, three to four inches in width, one-fourth inch or less in thickness. Obtained from the trunk and large branches, usually broken; corky layer generally removed (through its own want of adhesiveness.) External layer marked with patches of cork and furrowed; color, light cinnamon, very finely striated; bast fibres are single; transverse fracture short and fibrous; fissures are nearly square and regular. Of recent date very little of the flat Calisaya has come to this country.

Officinal yellow bark is characterized by the shortness of the fibres in the whole surface of its transverse fracture, the facility with which these may be separated, the uniform fawn color, without any white marking in its thickness, the *great density* of the bark, which is such, that when the nail is drawn across it, a shining track is often left, the depth of the depression, on its outer surface, and the prominence of the ridges that separate them. These remarks refer to the flat variety. Quills are not so easily distinguished; best test, its bitterness.

Characterized as a whole by its *strongly bitter* taste, *little astringency*; by its fine brownish yellow, somewhat orange color, which is still brighter in the powder, and by containing a larger proportion of Quinia, and comparatively little of other Cinchona alkaloids. The salts of Quinia and lime are so abundant that a strong infusion of it affords an instant precipitate when crystals of sodium sulphate are added.

The bark of Gomphosia Chlorantha, a lofty tree growing in the same forests where the Calisaya is found, is sometimes mixed with the genuine Calisaya, which it resembles closely. It is distinguished by a peculiar odor, and by exhibiting in its transverse section, under the microscope, "a peculiar fasiculate disposition of the cortical fibres, and some vessels gorged with a ruby-colored juice." It does not contain a particle of alkaloid, but yields a volatile oil, upon which its odor depends.

CINCHONA RUBRA. *C. succirubra.* Red Bark.

QUILL.—These are from one-fourth to one inch in diameter, from one-third of a line to two lines thick, and from two to twelve inches in length. The smaller quills are often spiral. External surface varies from a fawn gray to a dull reddish-brown; and in the smaller and medium size quills, it exhibits longitudinal wavy wrinkles. In the thicker pieces, these wrinkles, between which are scattered longitudinal furrows, often elevate themselves into roundish or oblong warts, which are of a somewhat friable and granular consistence. The inner surface is delicately fibrous, and almost uniform in the small quills; more fibrous and uneven in the larger. Fracture of the smaller quills is usually smooth; fibrous in the larger. Inner surface, cinnamon color; tan-like, earthy odor. The taste is bitter, but not disagreeably so, somewhat aromatic but not lasting.

FLAT.—From one to two inches broad, three-eights to one-fourth inch thick, and from two to twelve inches long. The corky layer adheres very closely to the bark. This consists of warts which run together to form longitudinal ridges. These furrows sometimes penetrate to the bark. Transverse fissures seldom occur. The pieces often in part or almost wholly covered with a white or yellowish gray coat, either belonging to the corky layer, or consisting of lichens. The inner surface is splintery and very irregular; its color varies with the size of the pieces; acquires the deep red color on exposure. Fracture, fibrous and splintery. The powder is of a dull brownish red. Chemically distinguished by containing considerable quantities of both Quinia and Cinchonia.

CINCHONA PALLIDA. Pale Cinchona.

Cinchona Condaminea. C. micrantha.

These appear in commerce, in cylindrical pieces of variable length, from a few inches to a foot and a half; sometimes singly, sometimes doubly quilled, from two lines to an inch in diameter, and from half a line to two or three lines in thickness. Exterior surface is usually more or less rough, marked with transverse and sometimes with longitudinal fissures, (but these do not form a network of ridges, as in C. Calisaya, and is thus distinguished,) and of a grayish color, owing to adhering lichens. The inner surface of the finer kinds is smooth; in the coarser, rough and somewhat ligneous; its color is a brownish orange. The fracture is usually smooth, with some short filaments on the internal part, but in the coarser, it is more fibrous. Feeble odor, which is distinct and aromatic in powder. Taste is moderately bitter, and somewhat astringent, without being disagreeable or nauseous. The powder is of a pale fawn color. From its appearance, it is usually collected from the small branches. That most highly esteemed, is known commercially as Loxa bark. Chemically characterized by containing a much larger proportion of Cinchonia, Quinidia or Cinchonidia, than of Quinia, and by its infusion not yielding a precipitate with a solution of Sodium Sulphate.

The false barks are very rarely met with now, but they can be readily distinguished by the cross sections with a microscope. All barks brought from the North Atlantic ports of S. Am. (New Granada and Venezula), may be classed under the head of Non-officinal or Carthagena barks. Most of these are characterized by a soft, whitish or yellowish white corky layer, which may be easily scraped by the nail, and which, though often removed more or less, still leaves traces behind sufficient to indicate its character. Those of them which may in other respects bear some resemblance to Calisaya, are in general readily distinguished by this character of the corky layer, also by its having the appearance as though the corky layer had been removed by scraping or cutting with a knife, and not spontaneously separated at the natural juncture, as in the Calisaya. They all contain the alkaloids in greater or less proportion, though they differ much in this respect.

The principal alkaloids found in Cinchona barks, (Quinia, Cinchonia, Quinidia, and Cinchonidia.) Their solubilities and tests will be found appended in *Table of Alkaloids.*

Bast Fibres, Chiefly Tangentially Striate; Brown.

NECTANDRA. *N. Rodiei.* Bebeeru Bark.

This is in large, flat, heavy pieces, from ten to twelve inches in length, from two to six inches broad, and one-eighth to one-fourth of an inch thick. Usually deprived of the cork, and as found in commerce, consists generally of the liber. Under the liber the secondary cork leaves shallow marks. Grayish brown color externally; internally, of a pale brown color, roughly striated, bast fibres, chiefly tangential. Breaks with a short fracture, which is occasioned by all of the cells having secondary deposits, which separates the primary layer, giving it the appearance of Cinchona. Inodorous; intensely bitter, somewhat astringent taste. The bark contains Bebeeria, apparently identical with Buxine; colorless, amorphous substance; Sipeeria, also amorphous, differing from Bebeeria in being insoluble in ether.

RADIALLY STRIATE.

Periderm, Brown; Bast, Pale Red.

CORNUS FLORIDA. *C. Florida.* Dogwood.

Appears in pieces of various sizes, generally broken up, usually more or less curved; generally the thickness of a line; corky layer sometimes attached, and again wholly destitute. Fawn color externally; internally, whitish, after drying, becomes reddish. This red color is due to the Tannin it contains; plainly radially striated, brittle, breaks with a short fracture; feeble odor; astringent, lasting bitter taste; grayish powder tinged with red. Contains a large quantity of Tannin—a bitter principle (called Cornine) not yet isolated, resin, gum, &c.

Periderm, Gray; Bast, Pale Cinnamon.

CORNUS CIRCINATA. *C. circinata.* Round Leaved Dogwood.

Bark of the branches employed, this appears in quills of various sizes. Externally, of a grayish brown color, marked with small corky warts, which form longitudinal wrinkles; internally, pale cinnamon, radially striated; no odor; taste, chemical constituents and medical virtues similar to C. Florida. The powder resembles that of Ipecac in color.

Periderm, Purplish Brown; Bast, Pale Cinnamon.

CORNUS SERICEA. *C. sericea.* Swamp Dogwood.

Appears in pieces varying in size. Externally, of a distinct purple color, corky, longitudinal ridges, irregular meshes, thin; internally, of a pale cinnamon color, radially striated; no odor; taste astringent; virtues &c., similar to above.

Periderm, Purplish Brown; Bast, Whitish.

LIRIODENDRON. *L. tulipifera.* Tulip Tree Bark.

Obtained from the branches, trunk and root, size of the pieces vary very much. Externally, of a distinct purplish tinge, large number of corky warts, which form longitudinal ridges. These alternate to form meshes, which are pretty regular; this is noticed particularly in the older barks. In very old barks, the purplish tinge gives way to a grayish color. Internally, whitish, when young, pale, yellowish brown in the older; internal part in distinct layers, wedges formed by the bast fibres, these are broadest toward the inner surface, separated by the medullary rays; radially striated. Breaks with fibrous fracture; particularly the inner section. No odor, and of a bitter, pungent taste. The old bark appears in commerce deprived of the cork. Distinguished from C. Sericea by the regular meshes, and taste. The bark is said to contain Liriodendrin. White, crystallizable, insoluble in water, soluble in alcohol and ether.

Periderm, Grayish; Bast, Whitish.

MAGNOLIA. *M. glauca. M. acuminata. M. tripetala.* Magnolia.

The size of the pieces vary, generally thin. The external layer is grayish; internal white. The structure resembles Liriodendron, with the exception of the corky warts being absent; the bast wedges are plainly visible in a cross section. Breaks with a short fracture. Aromatic odor when fresh, none when dry. Bitter, pungent, spicy taste, devoid of astringency. Contains Vol. Oil. Resin, and a principle analogous to Liriodendrin.

Periderm, Greenish Gray; Bast, Yellowish.

PRINOS. *P. verticillatus.* Black Alder.

The dried bark is in small, slender fragments, more or less rolled. Externally, greenish gray or greenish brown, and in the young bark, marked with transverse elongated scars; brownish tinge, left by dropping off of the warts, also covered with a large number of minute black dots, the beginning of warts. In the older barks, the black spots are larger but not as plainly visible. In commerce, the corky layer is usually removed, being easily separated. Internally, of a distinct yellow; transverse fracture, striated in radial lines, giving a checkered appearance; no odor, but a bitter and slightly astringent taste.

Periderm, Green Brown; Bast, Red Brown.

PRUNUS VIRGINIANA. *Cerasus serotina.* Wild Cherry.

Inner bark employed, collected from branches, trunk and root, (best). Varies in commerce. The branch bark is externally of a peculiar greenish brown color, more or less laterally curved, beset with transverse scars left by warts; these are narrow, usually, and pointed at both ends. In the older bark this is also noticed, but in these, the scars are more elongated; the corky layer drops off; also in the old barks, the primary layer is absent, and it consists entirely of liber. The inner portion is smooth and radially striated. Breaks with a short reddish gray fracture. Dry, no odor; but when moistened, of an odor resembling fresh peach leaves; taste aromatic and bitter, with a bitter almond flavor; affords a fawn colored powder. By contact with water, Hydrocyanic Acid is developed; this, due to the mutual action of Amygdalin and Emulsin. Contains in addition, another bitter principle, also probably Tannin, Gallic Acid, &c. The bark is strongest when collected in autumn.

BAST, CHECKERED; LAYERS, TANGENTIAL.

Internally, Yellow.

BERBERIS. *B. vulgaris.* Barberry.

Bark of the root employed; this is in pieces of various sizes, very thin. Exterior is of a grayish color, regularly and longitudinally striated. Interior of a distinct yellow color, particularly the bast fibres; these are in tangential layers, and checkered. The medullary rays are narrow. Easily broken, odorless, astringent, and lasting bitter taste; stains the saliva when chewed. Its active properties are due to Berberina, a yellow powder, which, under the microscope, is seen to be crystalline. Soluble in 100 parts cold water, insoluble in ether; its salts are less soluble. Precipitated from aqueous solutions by muriatic acid.

Internally, Pale Cinnamon.

SALIX. *S. alba.* Willow.

The commercial bark is obtained from several species; appears in flat pieces and quills. Exterior gray, with confluent warts; interior, pale cinnamon, bast checkered, layers, tangential. Flexible, and of fibrous fracture, difficult to pulverize. No odor; bitter, astringent taste. S. alba is distinguished from the purple, mainly by always being of a lighter color, and the twigs breaking easier on the tree. Purple variety contains the largest amount of Salicin, white the largest amount of Tannin. The degree of bitterness in the bark is probably the best criterion of the value of the several species. The bark contains considerable Tannin (is even used for tanning leather), coloring matter, &c.; but the most interesting constituent is Salicin, soluble in cold water, more so in boiling water, soluble in alcohol, insoluble in ether. Concentrated sulphuric acid produces an intense bright red color.

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2. ASTRINGENT.

Bast Checkered.

QUERCUS. } *Q. alba.* White Oak Bark.
Q. tinctoria. Black Oak Bark.

Inner bark only employed, generally collected from trunk. That directed by the Br. P. only from the young stems and branches. Appears in commerce in small fragments. The Q. alba and Q. tinctoria differ in the first, always having a white corky layer, and the internal structure always lighter—even in the ground bark—than the latter; also by the latter having a more astringent taste and staining the saliva yellow when chewed. Both characterized by the bast fibres being in tangential rows, dissected by medullary rays, giving them a checkered appearance. The bast fibres are strong and prominent, between which the medullary rays are depressed; also by the bast and primary layers consisting of hard and thick stone cells. Fibrous fracture; no odor; astringent taste. The principal constituent is Tannic acid, of which it yields a large percentage.

Bast Tangentially Striated.

RUBUS. *R. Canadensis.* *R. villosus.* Blackberry Root.

Collected from the root. Appears in commerce usually attached to the wood. Exterior of a dark brown color and wrinkled longitudinally. Interior surface of a light brown color; layers are strong; bast layers tangential; bast fibres easily removed. Very thin; breaks transversely with much difficulty; inodorous, but of a strongly astringent taste. It abounds in Tannin.

Bast Scarcely Striated.

GRANATI RADICIS CORTEX. Pomegranate Root Bark.

Punica Granatum.

The root bark is directed by the U. S. P., but the bark commercially sold as such, consists really in a great measure of that of the stem; a little proper root bark occasionally mixed with it. The proper bark appears in commerce usually in fragments of quills, double or single, one to three inches in length, and from one-fourth to one inch in diameter. Externally covered with a rather thick dark brown cork, more or less covered with irregular longitudinally cleft ridges. Underneath this is a thin soft corky surface, of a grayish orange color. Inner bark yellowish white, smooth, scarcely striate. Breaks with a very short and smooth fracture in both directions. Medullary rays are very narrow, consisting of one row of cells, and these are not elongated, but quadratic. No bast fibres, but parenchyma cells; these are large, and at a distance from the cambium. A row of crystal cells are contained by the side of the medullary rays. The trunk bark has a thinner cork, with the fissured ridges more regularly longitudinal, and a color more decidedly gray, varied by patches of blackish brown. No odor, but of a strong astringent taste, coloring the saliva yellow when chewed. The inner surface of the bark, steeped in water and then rubbed on paper, produces a yellow stain, which, by the contact of $Fe So_4$ is rendered blue, and by that of HNO_3 a rose tint, which soon vanishes. These properties serve to distinguish it from the bark of the box root and barberry, with which it is sometimes adulterated. Contains 22 per cent. of Tannin—a peculiar variety. When boiled with dilute sulphuric acid, it is resolved into Ellagic acid and sugar.

3. BITTER.

Bast, Radially Striate; Pale Brownish.

SIMARUBA. *S. officinalis.* Simaruba.

Bark of the root. This appears in long pieces, more or less curved lengthwise. Sometimes two to three inches wide; light, flexible, tenacious. Outer layer dark brown, rough, warty, and marked with transverse ridges. Inner surface varies, generally of a yellowish white color. Almost impossible to break transversely; the bast fibres run in different directions; can be torn longitudinally, separating a number of fibres; these bast fibres are long and tough, arranged in oblique, and more or less wavy wedges, forming rather tangential or irregular lines, but so close together as to give a radial appearance. The barks of Quassia amara and Q. excelsa, are closely allied to Simaruba. They differ, though, in the Q. excelsa having a black cork, and Q. amara having a thin bark, breaking easy transversely. Inodorous, and of a lasting, bitter taste. Contains a bitter principle analogous to Quassin.

Bast Scarcely Striate; Yellowish, Under Cork Red.

FRANGULA. *Rhamnus Frangula.* Frangula.

Comes in quills of an ash gray color.

Bast Tangentially Striate; White, Turning Dark Brown.

JUGLANS. *J. cinerea.* Butternut.

Inner bark. This appears in small pieces, and generally curved. Has a thick, corky layer, which is readily removed. Externally, when fresh, is of a white color, but when dry, dark brown; shows in the same manner internally, showing white parenchyma and brown bast fibres, thus giving it a mottled appearance of white and brown, when carefully dried, but it is of a uniform dark brown when not. Bast fibres arranged in tangential lines, dissected with regular medullary rays, giving a checkered appearance. The fracture longitudinally, and of the outer layer, is short, while the fracture of the inner bark is hard. Feeble odor, bitter taste. Its medicinal virtues are extracted by boiling water; the presence of tannin is not evinced by the test of gelatin.

Bast Tangentially Striate; White and Yellow.

AZEDARACH. *Melia Azedarach.* Azedarach.

Occurs in commerce in very irregular pieces. Exterior, dark brown; interior and near the cork, red. Bast fibres arranged tangentially. Breaks with much difficulty transversely, bast fibres separating. No odor; bitter, nauseous taste.

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4. ACRID.

Bast, Tangentially Striate; Brittle.

XANTHOXYLUM. Prickly Ash.
X. fraxineum. X. Carolinianum.

As found in commerce, is in quills, from a sixteenth to a twelfth of an inch thick, and about an inch in diameter. Externally, of a dark gray, diversified by irregular whitish patches, and occasionally marked by closely set transverse cracks, also with spines which are placed in a short corky excrescence; the spines are sharp and short, and generally fall, or are broken off, leaving scars. Internally gray and shining; tangentially striate, and exhibiting occasionally remains of the prickles. Very light and brittle; inodorous, acrid taste.

The So. Prickly Ash Bark is obtained from X. Carolinianum. This differs from the above in consisting of irregular fragments of a bark of larger dimensions; flat or but slightly rolled, and exhibiting on the outer surface occasionally, large conical, corky eminences, which serve as the bases of the spines. The bark of Aralia spinosa (Angelica tree), So. States, has the same medicinal virtues. Constituents are vol. oil, fixed oil, resin, &c., and peculiar crystalizable principle, called Xanthoxylin.

Bast Tangentially Striate, Tough; Outer Bark, Greenish.

MEZEREUM. *Daphne Mezereum. D. Gnidium.* Mezereon.

This comes to us in strips, from two to four feet long, an inch or less broad, and a line or so in thickness, and always folded in bundles, or wrapped in a globular shape. It is covered externally, with a very thin, easily separable, corky layer of a greenish orange or purple color, also with black scars, which are arranged transversely, and are elongated. Beneath the corky layer, is a soft, greenish tissue. The inner bark is whitish, smooth or finely striated; bast layers of a glossy appearance, bast fibres very fine and arranged tangentially. Pliable, can be torn longitudinally, not broken transversely. No odor, taste extremely acrid. The acrid principle of this bark is a resinoid contained in the inner bark—not yet examined.

Bast Tangentially Striate, Tough; Outer Bark Reddish.

GOSSYPII RADICIS CORTEX. Cotton Root Bark.

G. herbaceum, and other species of G.

Bark of the root employed. Conical root, sparingly branched, wood white and hard. The bark appears in long pieces, one to two inches wide and about one line in thickness, generally curved; of a brownish red color externally, and the surface dotted with small black spots. Inner surface white and satiny; tough, breaks very hard transversely, torn longitudinally. No odor, and little taste. Distinguished from Mezereum by the numerous black dots on its surface, (not elongated,) and its glossy external appearance, also by the taste of Mezereum. Contains a peculiar acrid resin, colorless and soluble in water when pure; by exposure it absorbs oxygen, becoming red and insoluble.

Bast Checkered.

QUILLAYA. *Q. Saponaria.* Soap Bark.

Liber used—long pieces of various widths and thickness. Bast fibres checkered, breaks very hard transversely or longitudinally. Produces violent sneezing when broken near the nostrils. Acrid taste; foams with water. Contains Saponin—the frothing principle.

5. MUCILAGINOUS.

Bast Checkered.

ULMUS. *U. fulva.* Slippery Elm.

Inner bark officinal. Is in long, nearly flat pieces, from one to two lines thick. As found in commerce, it consists entirely of bast, but patches of cork are occasionally observed. Both inner and outer portions are of a pale brown color; inner portion finely striated; bast imbedded in soft parenchyma; woolly appearance. Bast fibres arranged tangentially; separated from each other by parenchyma and large numbers of medullary rays, thus giving the bark a checkered appearance. Fibrous texture, should be capable of being folded lengthwise without breaking. The inferior kinds are brittle. Slight sweetish odor, and a highly mucilaginous taste when chewed.

Distinguished from U. Americana (white elm) by its rough branches, larger, thicker and rougher leaves, its downy buds and the character of its flowers and seed. And from U. campestris (Br. Ph.) by the astringent taste and darker color of the latter. The mucilage in which it abounds, is precipitated by solutions of acetate and subacetate of lead, but not by alcohol.

6. AROMATIC. WITH OIL OR RESIN CELLS; BAST RADIALLY STRIATE.

CINNAMOMUM.

Taste astringent; bark papery; compound quills.—Cinnamomum Zeylanicum.
" " " thicker; quills simple.—Cinnamomum aromaticum.

The aromatic character of these barks are much influenced, according to climate, soil and mode of culture.

Cinnamomum Zeylanicum.—Ceylon Cinnamon.—This is in long cylindrical quills, the larger enclosing the smaller. In the original sticks, which are sometimes more than three feet in length, two or three fasciculi are neatly joined together, so as to appear as one continuous piece. The finest is of a light brownish color, both internally and externally. Bast fibres on outer surface have a satiny appearance, and small holes may be seen, produced by leaf scars. Inner surface perfectly smooth, with a few stone cells, and scarcely striated. Each individual bark usually very thin, sometimes one-hundreth of an inch. Pliable to a considerable extent, splintery fracture when broken. Pleasant fragrant odor, and a warm, aromatic, pungent, slightly astringent taste. The most interesting constituent is the Vol. Oil (Sp. Gr. 1.035) consists chiefly of Cinnamic Aldehyde, with a variable proportion of hydrocarbons. It easily absorbs oxygen, and becomes contaminated with resin and cinnamic acid. At a low temperature it deposits a camphor. Cinnamon also contains sugar, mannite, starch, mucilage and Tannic acid.

CINNAMOMUM AROMATICUM.—Cassia.—China and Cochin furnish a variety of cinnamon known in commerce as Cassia, and also yielding the Cassia buds. This usually occurs in simple quills, from an eighth of an inch to an inch indiameter, In some instances the bark is rolled very much upon itself; in others, is not even completely quilled, forming segments more or less extensive of a hollow cylinder. It is invariably thicker and of a darker color than C. Zeylanicum, both internally and externally, denser, and breaks with a shorter fracture. Usually deprived of the corky layer, but patches of the cork are sometimes present. Inner surface not as smooth, and more striated, the stone cells are more scattered; similar odor; taste stronger, more pungent and astringent than the former variety. Constituents.—See above, under C. Zeylanicum.

Taste Astringent, Rust Brown, Flattish.

SASSAFRAS. *S. officinale.* Sassafras.

As found in the shops, this is usually in small, irregular fragments sometimes invested with a brownish fissured, corky layer, sometimes partially or wholly freed from it. Of a reddish or rusty cinnamon color—varies in color in the same bark; very brittle, breaking with a short fracture, both transversely and longitudinally, and presenting, when freshly broken, a lighter color than that of the exposed surface, and exhibiting a large number of oil cells. The living bark is nearly white, but becomes colored on exposure. Highly fragrant odor; sweetish, aromatic taste. The bark of the root is the officinal portion. Should be collected in autumn, after frost. This bark contains a light and heavy volatile oil, camphorous matter, and a peculiar principle (sassafrid) resembling tannin, resin, wax, &c.

Taste Bitter, Pungent; Periderm Reddish; Inside, White.

CANELLA. *C. alba.* Canella.

The bark of the branches, which is the part found in commerce, is deprived of its corky layer, and dried in the shade. It is in pieces, partially or completely quilled, sometimes twisted; of various sizes, from a few inches to a foot or more in length, from half a line to three lines in thickness, and in the quill from half an inch to an inch and a half in diameter. The outer layer is generally reddish, due to the corky layer, which becomes thickened and soft, and imparts the color; also dotted by scars left by dropping off of warts. The inner surface is smooth and radially striated, and of a white color. Breaks with a short fracture. Aromatic, clove-like odor, and a warm, bitterish, very pungent taste, entirely devoid of astringency. Contains Vol. Oil, which is found to consist of four different oils, one of which is closely identical with Eugenic Acid of Oil of Cloves; another is closely allied to the chief constituent of Cajuput Oil.

Taste, Bitter, Pungent; Periderm, Reddish; Inside Gray.

WINTERA. *Drimys Winteri.* Winter's Bark.

Appears in quills the same as Canella, but is distinguished from it by its astringent taste, due to Tannin and Ferri Ox., and by the inner surface being of a reddish or grayish tinge.

Taste, Very Bitter; Periderm, Reddish; Inside, Paler.

ANGUSTURA. *Galipea officinalis.* Angustura.

This appears in pieces, sometimes quilled, though rarely; sometimes nearly flat, and often curved; from three to four inches in length, and from a half line to two lines in thickness, pared away towards the edges. Covered externally with a reddish brown corky layer, when young; but when older and thicker, becomes lighter in color, inclining to yellow corky layer; disposed in shallow longitudinal fissures, easily scraped by the nail. Internally of a light brown color. Breaks both transversely and longitudinally with a very short, resinous fracture, exhibiting white, shining spots, which are crystal cells, containing CaOx.; but when macerated in water, it becomes soft and tenacious. Contains only a few bast fibres; large number of oil cells, which are darker than the surrounding tissue. When fresh, of a disagreeable odor; but when dry, this is rendered very faint. Distinct bitter taste.

False Angustura Bark is distinguished by its greater thickness, hardness, weight and compactness; by its resinous fracture; by the appearance of its corky layer, which is sometimes covered with an iron-like efflorescence, sometimes is yellowish gray and marked with prominent white spots; by the brownish color and smoothness of its internal surface, which is not, like that of the genuine, separated into layers, by its total want of odor, and its intense tenacious bitter taste. And when steeped in water, it does not become soft like the true Angustura. As it yields brucia, it is generally believed to be derived from the Strychnos Nux Vomica. A drop of Nitric Acid upon the internal surface of the bark produces a deep red spot. The same acid applied to the external surface produces an emerald green. In *true* Angustura Bark a dull red color is produced by the acid on both sides. Angustura Bark owes its peculiar odor to an essential oil. Contains Cusparin (the bitter principle), crystalline, neutral, soluble in alcohol, precipitated by Tannic Acid.

Taste, Very Bitter; Periderm, White; Inside, Brown.

CASCARILLA. *Croton Eluteria.* Cascarilla.

In commerce this appears in thin quills, generally broken in very small pieces, with portions of white wood attached. Covered externally with a silvery white, corky layer, dotted with blackish spots. Internally pale brown. Breaks with a short fracture, both transversely and longitudinally, and exhibiting a resinous appearance. Peculiar odor when ignited, resembling musk, very little when dry. Aromatic, bitter taste. The bark yields a volatile oil, to the extent of ¾ to 1 per cent.; a peculiar resin, consisting of two portions, one acid, soluble in alkalies, the other indifferent, about 15 per cent., also a bitter principle called Cascarillin.

Taste Very Bitter; Thick; Ochre Color; Bast Splintery. COPALCHI.
" " " *Thin;* " " " " MALAMBO.

COPALCHI bark, of Mexico, has been mistaken both for Cascarilla and Cinchona. Appears in thick quills, externally of an ash color; internal surface of an ochre color; bast splintery. Taste, bitter; same odor as Cascarilla when burnt.

MALAMBO of New Granada, is in pieces of various sizes, thin, brittle, though somewhat fibrous; of an ash color externally, and of an ochre color internally; bast splintery. Aromatic odor, bitter pungent taste.

LEAVES AND LEAFLETS.

1. MARGIN ENTIRE.

CORIACEOUS, AROMATIC.

Sessile, Linear, Revolute, Tomentose Beneath.

ROSMARINUS. *R. officinalis.* Rosemary.

Evergreen shrub, three to four feet high, with an erect stem divided into many long, slender grayish branches. The leaves are numerous, sessile, opposite, one inch or more in length, and about one-sixth of an inch broad; linear, entire, obtuse at the summit; upper surface dark and smooth, lower surface whitish and covered with radiate hairs. When dried, the margin of the leaf rolls up, giving it a needle-like appearance, of a firm consistence. The lower side is also covered with oil glands of two kinds, large and small, probably yielding distinct oils. Of little odor when fresh, and may be kept for some time, but when crushed of a peculiar balsamic odor. Aromatic, pungent taste. The odor is due to a vol. oil which it contains to the extent of about 2 per cent. This is yellowish, and of a sp. gr. of .90. Consists chiefly of a hydro carbon ($C_{10}H_{16}$) and another substance related to the camphors. This oil yields Limettic Acid by action of bichromate of potassium and sulphuric acid.

Short-Stalked, Broad-Oval, Hairy Beneath.

BOLDOA. *B. fragrans.* Boldo.

This is an evergreen shrub, growing in Chili. The leaves are entire, oval, about an inch in length, reddish brown when dry, hairy beneath, coriaceous, with a prominent midrib and numerous small oil glands on their surface. Of an agreeable odor and taste. Contains an alkaloid (Boldine) and a vol. oil.

Nearly Sessile, Lance-Oblong, Retuse, Base Unequal.

PILOCARPUS. *P. pinnatifolius.* Jaborandi.

Leaves are nearly sessile, pinnate, with a terminal leaflet, general outline ovate. The leaflets, which are from two to five in number, joined at the axis by short petioles, are uneven at the base, about two inches in length, lance-oblong in outline, apex marginate or retuse, veins quite prominent, always parallel near the margin, and unite near the apex, covered with oil cells; coriaceous. Aromatic. Pilocarpia, an alkaloid, and a vol. oil are its constituents.

Short-Stalked, Lance-Oblong, or Narrow Curved.

EUCALYPTUS. *E. globulus.* Eucalyptus.

This is a large tree of rapid growth, inhabiting Australia, and is said to destroy miasma. The leaves are about a foot in length, varying in shape according to age; when young, lanceolate and usually cordate at base; when old, very narrow, nearly linear-lanceolate and serrate; upper surface dark green, lower surface palish green. Thick, leathery texture. Aromatic. Its virtues depend upon a vol. oil; of this oil, the fresh leaves yields 2.75 per cent., and the recently dried, 6 per cent. This oil is composed of two camphors, the larger proportion of which is known as Eucalyptol.

Elliptic, Smooth; Reticulate Above.

MYRCIA. *M. acris.* Bay Leaves.

These are opposite, from three to five inches long, very coriaceous; broad, oval, smooth; scarcely acute at apex, entire at margin, wavy, with numerous parallel nerves prominently reticulated on the upper surface and sprinkled with oil glands Very fragrant odor. Aromatic, astringent taste. It yields a vol. oil on distillation, of an odor resembling oil of cloves, also giving the same reaction with KHO forming a solid salt.

Oval-Oblong, Smooth; Petiole, Winged.

AURANTIUM. *Citrus A.* Orange Leaves.

Oval-oblong, smooth, acute, entire, and of a shining pale green color, coriaceous; numerous oil-glands. Characterized by winged petiole. Highly fragrant when rubbed. Aromatic, bitter taste. Yields a vol. oil, known as *petit grain.*

CORIACEOUS, INODOROUS.

Obovate, Smooth, Reticulate.

UVA URSI. *Arctostaphylos Uva Ursi.* Bearberry.

This is a small creeping shrub, the young branches of which rise obliquely upwards for a few inches. The leaves are scattered, upon short petioles, from half an inch to an inch in length, obovate, round at the apex, narrow at the base, with a rounded margin; entire, thick, coriaceous, smooth, shining; dark glossy gray on their upper surface, lighter and reticulated beneath. Dry, no odor; astringent taste. Adulterated vith Vaccinium Vitis Idæa (European), distinguished by their rounder shape, their revolute edges, which are sometimes slightly toothed, and the appearance of their under surface, which is dotted, instead of being reticulated like the genuine leaf. Also adulterated with Chimaphilia (native), which are readily distinguished by their greater length, their wedged, lanceolate shape, and their serrate edges.

Uva Ursi should be gathered in autumn, and the green leaves only selected. It contains Tannin (black with Fe.), Gallic Acid, Arbutine and Ursone. Arbutin occurs in white or yellow crystals, and of a distinct bitter taste. It is a glucoside, and by the action of acids is decomposed into Arctuvine (Hydrokinone) and glucose. The action of MnO_2 and H_2SO_4 converts it into Kinone and formic acid.

Roundish, Cordate, Bristly.

EPIGEA. *E. repens.* Trailing Arbutus.

Small, trailing plant. Leaves roundish, entire, cordate, ovate, bristly. Same properties as Uva Ursi; same constituents.

NOT CORIACEOUS OR AROMATIC.

Small; Base Uneven; Lanceolate.

SENNA. { *Cassia acutifolia.* *Cassia obovata.* *Cassia elongata.* } Senna.

The group Senna, belonging to the genus Cassia, of which the several species contribute to furnish the drug, is characterized by having the leaves destitute of glands and the fruit very broad, almost winged, and by the base of the leaves being uneven. It is thus distinguished from Cassia Marilandica, and Solenostemma Argel; from the former, by its having leaves with glands, and its legume (fruit) being very narrow, about the same width as the seeds; and therefore not belonging to the Senna group; from the argel, by the even base of its leaflets, and from general adulterations by the above described properties. The odor of Senna is faint and sickly; the taste slightly bitter, sweetish, and nauseous. The color varies from a fine green to a yellowish or tawny hue.

Cassia acutifolia.—This variety occurs in Eastern and Central Africa, and in So. Asia and So. Nubia. It is described as a shrub from three to four feet high, with a straight, woody, branching, whitish stem. The leaves are alternate and pinnate, with glandless petioles, and two small narrow pointed stipules at the base. The leaflets, of which from four to six pairs belong to each leaf, are almost sessile, lanceolate, acute, oblique at their base; nerved veins distinctly visible, from half an inch to an inch long, upper and lower surface smooth, and of a yellowish green color.

This species furnishes the greater part of the variety known in commerce as Alexandria Senna. It is collected in Nubia, in the fall and spring, by cutting the branches and exposing to the sun, then stripping off the leaves and pods, which are packed in bales and shipped to Alexandria. In market it appears more or less broken and mixed with branches.

C. lanceolata (found in the deserts of Arabia) differs from the the above chiefly in having leaflets with glandular petioles, and is supposed to furnish a variety of senna brought to this market under the name of Mecca Senna. C. æthiopica, of Fezzan, to the south of Tripoli, was formerly confounded with C. acutifolia. This furnishes the variety known as Tripoli Senna.

Cassia obovata.—This variety occurs in Syria, Egypt and Senegambia, and is cultivated successfully in the West Indies and Jamaica Islands. The stem is about eighteen inches high and annual. The leaves have from five to seven pairs of leaflets, which are obovate, with a rounded very obtuse summit, sometimes mucronate, and gradually diminish in breadth towards their base. In other respects it is very similar to C. acutifolia. It yields the variety of senna known in Europe as Aleppo Senna, and contributes to the Alexandrian.

CASSIA ELONGATA.—This variety occurs in So. Arabia, E. Coast of Africa, and in the Northern Section of the East Indies, and has been transplanted to So. E. I. As usually grown, it is annual; but with care may be made to assume the character of a shrub. It has an erect, smooth stem and pinnate leaves, with from four to eight pairs of leaflets. These are nearly sessile, lanceolate, obscurely mucronate, oblique at the base, smooth above and somewhat downy beneath, with the veins turned inwards, so as to form a wavy line immediately within the edge of the leaflet. It varies in length from one to two inches. The petioles are glandless; the stipules minute, spreading and semi-hastate.

This variety is collected in So. Arabia and shipped to Bombay; and is also cultivated in Tinnevelly. It is known in commerce as Tinnevelly, Bombay, and E. Indian Senna.

The name of E. Indian Senna is also given to different species of senna growing in the E. I. The leaves are narrower, longer and more coriaceous than those of Alex. Senna and contain much less of the active principle than the Alex., the latter yielding half as much again as the former.

Its chief constituent is *Cathartic Acid.* This is a glucoside, and when boiled with alcohol and hydrochloric acid it is resolved into glucose and *Cathartogenic Acid.*

Small, Base Uneven, Lance-Oblong.

CASSIA MARILANDICA. *C. Marilandica.* American Senna.

This is a half-shrub of vigorous growth, sending up numerous round, erect, nearly smooth stems, usually simple, and from three to six feet high. The leaves are alternate, and composed of from eight to ten pairs of leaflets. These are oblong-lanceolate, smooth, mucronate, of uneven base, green on their upper surface, pale beneath, and connected by short foot-stalks with the common foot-stalk, which is compressed, channeled above, and furnished near its base with an ovate, stipitate gland. They are from an inch and a half to two inches long, from a quarter to half an inch broad, thin and pliable. They have a feeble odor and a nauseous taste, both reminding of senna. Should be collected in autumn. Contains a principle analogous to *Cathartic Acid.*

Oval-Oblong, Reticulate on Both Sides.

COCA. *Erythoxylon C.* Coca.

Shrub growing wild in So. Am. The leaves are oval-oblong, entire, two inches or more in length by an inch or less broad, and furnished with short foot-stalks. Texture between coriaceous and herbaceous; reticulate on both sides with prominent nerves; on the lower surface, two lines, one on each side, run parallel with the midrib the entire length of the leaf. Tealike odor; peculiar, astringent taste. An alkaloid, *Cocaina* and *Cocatannic Acid* are its important principles.

Ovate-Oblong, Petiolate, Smooth.

BELLADONNA. *Atropa Belladonna.* Deadly Nightshade.

Herbaceous plant, from which arises several erect, round, purplish, branching stems to the height of three to four feet. The leaves, which are attached by short foot-stalks to the stem, are in pairs of unequal size, the larger being as large again as the smaller; length of the larger is from three to four inches. General outline is broad-oval, tapering both at apex and base, narrowing to the petiole; entire. When fresh they are quite thick and juicy and of a heavy, narcotic odor; but when dried they are very thin and of a tealike odor, with a slightly bitter, saline taste. Upper portion brown, lower green (others should be rejected), entirely smooth, but when young are occasionally found slightly pubescent. A characteristic mark is, that circular holes are formed on the leaves by the corky excrescences dropping off. Should be collected in time of flowering (June or July). The relative strength of the root and leaves is in favor of the former to a considerable extent. The important constituent is *Atropia*, which occurs in the leaf in the state of a malate, the per cent. yielded being from 0.44 to 0.48. Atropia ($C_{17}H_{23}NO_3$) occurs in colorless, inodorous, silky prisms Soluble in 200 pts. cold and 54 pts. boiling water; readily soluble in Alcohol, Ether (25 pts), Chloroform and Glycerine (50); fusible; responds to all the alkaloidal tests, but the best test is its action on the pupil of the eye, which it powerfully dilates. *Asparagin* is also found in the leaves.

Lanceolate, Tapering, Sessile, Hairy.

TABACUM. *Nicotiana Tabacum.* Tobacco.

Annual plant, with an erect, round, hairy, viscid stem, branches near the top, and rises from three to six feet. The leaves are numerous, alternate, sessile, and somewhat decurrent, radial, very large, lanceolate, pointed and entire. The lowest are often two feet long by six inches broad, then gradually become smaller toward the apex. When green, they are juicy and thick, very pubescent, and contain a large number of glands, on drying they shrink considerably, the pubescense being less observable, and invariably turn to a brown color. Tobacco appears in commerce in large leaves, more or less broken, of a brownish color, thin texture, a strong, penetrating odor, and of a strong, bitter, saline taste. The characteristic odor of the dried leaves is developed during the process of curing. The leaves are increased in size by removing the tops of the plants. Collected in August. The active principle of tobacco is a volatile alkaloid termed *Nicotina* ($C_{10}H_{14}N_2$). It is extracted as a malate, and yields from 2 to 8 per cent. Nicotina is a colorless oily liquid, of sp. gr. 1.027; boils at 250° C; does not concrete at 10° C; assumes a brown color on exposure. Strong alkaline reaction, deadly poisonous, capable of crystallizing in vacuo, and yields crystallizable salts. When pure and cold of but little odor, but at common temp. it has a strong smell of old pipes. Its vapor is acrid and nauseous. Very soluble in water, alcohol and ether. Its salts are deliquescent.

Nicotianin (Tobacco Camphor) is probably the odorous principle. Tobacco leaves are also remarkably rich in inorganic constituents, the proportion varying from 16 to 27 per cent.

2. MARGIN TOOTHED.

NOT CORIACEOUS.

Angular-Toothed, Petiolate, Smooth.

STRAMONII FOLIA. *Datura Stramonium.* Thorn Apple.

Annual plant, growing rapidly in waste places, about six feet high, the stem branches similar to those of Belladonna; usually in two parts. The flower bears a close resemblance to the morning glory. The leaves, which stand on short, round petioles in the forks of the stem, are five to seven inches long, broad-oval in general outline, base narrow and sometimes abrupt, margin deeply angular toothed, and the large teeth also toothed; upper surface dark green, paler beneath. Slightly pubescent when young, which disappears when old, except on the angles of the nerves. When fresh, of a thick and juicy consistence, and of a prominent, disagreeable, narcotic odor; but when dry, very thin, and of a less fetid odor. They are also marked with circular perforations. Taste bitter and saline. Gathered during flowering. Two varieties: D. Tatula said to be the strongest. Its active constituent is *Daturia*, which it yields to the extent of about 0.1 per cent. This is chemically identical with atropia, and medicinally produces the same effect, but differs quantitatively, being *twice as powerful.*

Pinnate-Toothed, Sessile, Clammy, Pubescent.

HYOSCYAMUS. *H. niger.* Henbane.

In the wild state usually annual; cultivated, assumes biennial form. Erect, round, hairy, branching stem, about three feet high, and thickly covered with leaves. These are large at the base, but become very small towards the apex of the stem. Sessile; general outline is broad-lanceolate. Each side of the margin is divided into four or five large teeth, almost lobed, these lobes are also lanceolate; wavy, soft to the touch, and *at their base embrace the stem;* pubescent, *especially the lower surface*, which is of a grayish color; upper surface of a sea green. When fresh, they are thick, but shrink on drying, though not as much as Belladonna or Stramonium, and on shrinking *the midrib becomes very prominent.* Disagreeable odor in the fresh state, which is lessened to a great degree on drying, but on moistening with warm water, the odor reappears. Bitter, saline taste. Collected during the period of flowering. *Hyoscyamia,* its active principle, is a crystalline alkaloid closely resembling atropia. Silky needles, acrid taste, dilates pupil powerfully. It is readily decomposed by caustic alkalies.

Crenate, Ovate, White Reticulate.

DIGITALIS. *D. purpurea.* Foxglove.

Biennial; first year radial leaves, second year radial leaves and flowering stem; long raceme of pendulous flowers of a purplish red color; stem four to five feet high. Directed to be taken from plants of the second year's growth. General outline of the leaf is ovate, but inclined to be ob-lanceolate; tapers at base to a winged petiole; entire length of the lower leaves is from six to eight inches by about three inches broad; petiole about the same length as the leaf; stem leaves gradually become smaller, and also the petioles; the leaves of the first year are more narrow and lanceolate than those of the second year's growth. Thick texture—not coriaceous;

THE NARCOTIC LEAVES.

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SMOOTH.

OFFICINAL NAME.	NATURAL ORDER.	WHEN TO COLLECT AND HABITAT.	CHEMICAL CONST'S.	PHYSICAL PROPERTIES, ETC.
Belladonnae Folia.	Solanaceae.	*June or July.* Europe.	Atropia. . . .	Ovate-oblong, petiolate, smooth, entire, pairs of unequal size, granular beneath.
Stramonii Folia.	Solanaceae.	*During flowering.* Asia (supposed).	Daturia. . . .	Angular-toothed, petiolate, smooth, granular, broad oval, base unequal; large teeth also toothed.
Aconiti Folia.	Ranunculaceae.	*During flowering.* Europe and Asia.	Aconitia, Aconitic Acid.	Palmate-lobed, segments linear-lanceolate, sub-coriaceous, bitter tingling taste.
Conii Folia.	Umbelliferae.	*When the fruit begins to form.* Europe, Nat'd U. S.	Conia (Volatile Alkaloid).	Gray-green, pinnate, ovate-oblong, incised, acute, mouse like odor.

HAIRY.

OFFICINAL NAME.	NATURAL ORDER.	WHEN TO COLLECT AND HABITAT.	CHEMICAL CONST'S.	PHYSICAL PROPERTIES, ETC.
Hyoscyami Folia.	Solanaceae.	*During flowering.* Europe, Nat'd U. S.	Hyoscyamia, . .	Pinnate-toothed, sessile, clammy pubescent, outline broad lanceolate, lobes also lanceolate, midrib very prominent.
Digitalis.	Scrophulariaceae,	*In the second year during flowering.* Europe.	Digitaline (glucoside).	Crenate, ovate, white reticulate below, midrib of a purplish tinge, first year's leaves narrower and more lanceolate.
Tabacum.	Solanaceae.	*August.* Tropical America.	Nicotia, Nicotianin, odorous principle.	Lanceolate, tapering, sessile, entire, one to two feet long, by six inches broad, strong, penetrating odor, bitter, saline taste.

margin crenate, wrinkled velvety surfaces, of which the upper is of a fine dark green, lighter when dry, the lower paler and more downy; *the lower surface is also reticulated, the venation forming meshes. These veins are covered with white hairs.* The midrib is broad, but not as prominent as that of Hyoscyamus, and of *a purplish tinge.* Tea-like odor, bitter, nauseous taste. Its active principle, *Digitaline,* is not an alkaloid, but a glucoside; decomposed by acids to *Digitaliretin* and glucose.

Crenate, Lanceolate, Brown Reticulate.

MATICO. *Artanthe elongata.* Matico.

Shrub, with a jointed stem, twelve feet high. The leaves are sessile or very shortly petiolate, lanceolate in outline, pointed; base uneven, inclined to cordate; margin crenate; two or three inches long by an inch broad; bright green on the upper surface, hairs depressed, paler and downy beneath; minutely and strongly reticulated. The hairs on the veins are of a brownish color. Aromatic odor; peppery taste. *Artanthic acid,* vol. oil and resin are contained in the leaves. No principle analogous to piperin or cubebin is to be found in them.

Crenate, Lanceolate-Oblong, Rugose, Gray-Green.

SALVIA. *S. officinalis.* Sage.

Half shrub, two feet high. The leaves are petiolate, ovate, inclining to lanceolate; margin crenulate, wrinkled; upper surface rough, grayish-green, sometimes tinged with red or purple; lower, plainly reticulate, and when fresh, oil glands are observed. Aromatic odor; warm, aromatic, astringent taste. Collected in June. The odor is due to a vol. oil. which it contains to the extent of .4 to 1.34 per cent. Sp. gr. .86 to .92. Tannin is also present.

Serrate, Lance-Oblong, Smooth, Dark-Green.

THEA. *T. Bohea.* Tea.

Evergreen shrub, from four to eight feet high, having numerous branches furnished with lance-oblong, pointed leaves, which are serrate except at base, smooth, dark, shining green, marked with one rib and many transverse veins; shortly petiolate; two to three inches long by half an inch or more broad. Refreshing, aromatic odor; astringent, slightly pungent taste. Contains an alkaloid, *Theina*, which is identical with Caffenia of Coffee, and also with the principles found in Paullinia and Ilex.

Sinuate, Serrate, Lance-Oblong, Acuminate, Smooth.

CASTANEA. *C. vesca.* Chestnut.

Large tree with leaves from four to eight inches long by about two in breadth, lance-oblong, sharp at the end, strongly and somewhat unequally serrated; margin repand 'dentate, with prominent parallel nerves beneath; brilliant green color, firm consistence, flexible, The leaves of the chestnut-oak, which have a very similar form and structure, are distinguished by their rounded crenate margins. No odor; slight, astringent taste. Collected late in Autumn. Contains considerable Tannin.

CORIACEOUS.

Serrate, Above Wedged, Lanceolate, Not Aromatic.

CHIMAPHILA. *C. umbellata.* Pipsissewa.

Evergreen plant, about eight inches high, having two or three whorls of leaves at apex of stem. The leaves are about two inches in length, ob-lanceolate, cuneiform at base, slight point at apex, coriaceous; margin serrate; upper surface shining dark green, lower, paler; entirely smooth. Scarcely any odor; astringent, slightly bitter taste. C. maculata has the same medicinal qualities, but differs physically in being oval-lanceolate, upper surface paler, and dotted with small white holes along the midrib. Same constituents as Uva Ursi. *Arbutin, Ursone* and *Tannin.*

Obscurely Serrate, Obovate, Aromatic.

GAULTHERIA. *G. procumbens.* { Wintergreen. Partridgeberry.

Small creeping plant, producing erect shoots with few leaves and flowers. Leaves are orbicular in outline, thick, coriaceous texture; upper surface dark green, smooth; lower lighter; margin thick and finely serrulate (pressed down to the margin), base free; short stalked, unequal size, Agreeable odor; aromatic, astringent taste. Contains *Vol. Oil*, *Arbutin* and *Ursone*. The Vol. Oil is chemically, *methylsalicylic acid or ether, or salicylate of methyl* ($CH_3C_7H_5O_3$). It has a sp. gr. of 1.173. Ol. Sassafras detected (if used to adulterate) by HNO_3, sp. gr. 1.42, which will turn the oil red, but not crystallize if Ol. Sassafras is present, but if pure, the oil will remain colorless or congeal to a crystalline mass.

Obscurely Serrate, Oblong Beneath, Near Base, Two to Four Glands.

LAUROCERASUS. *Prunus L.* Cherry Laurel.

Small tree. Leaves are shortly petiolate, oval-oblong, from five to seven inches long, acute, finely toothed, firm, coriaceous, smooth, shining green, with oblique nerves, and from two to four yellowish glands beneath, near the base. No odor, but when bruised having the odor of peach leaves; taste resembling flavor of peach kernels. By distillation with water, *Bitter Almond Oil* and *Hydrocyanic Acid* are yielded, produced, it is supposed by the decomposition of *Amygdalin.*

BUCHU.

Crenate, Oval-Obovate, Lanceolate, Aromatic.

Barosma crenulata, and B. serratifolia.

Dentate, Oval-Obovate, Apex Reflexed.

B. betulina vel crenata.

All of these are small shrubs, growing in the Southern part of Africa, a little north of Cape Town.

B. CRENULATA.—This variety has in a great measure disappeared from our market. Varies in shape from ovate to obovate; also varies in size, usually half an inch in length; margin minutely crenated, (crenulated) obtuse, coriaceous, narrowed towards the base into a distinct petiole; shining surface, full of oil glands, and small pellucid dots beneath.

B. BETULINA.—(Crenata, Br. Ph.) or short buchu, is cuneate-obovate, apex reflexed, dentate or sharply serrate, oil gland at each sinus; also dotted on the under surface; five nerved, about three-fourths of an inch long. Contains largest per cent. of volatile oil.

B. SERRATIFOLIA, or long buchu, is from one to one and a half inches long, very narrow, linear-lanceolate, base quite acute, apex truncate, margin firmly serrate, two teeth at apex, oil gland at each sinus all round the leaf; pellucid dots on under surface; three nerved. Sometimes mixed with Empleurum serrulatum, from which they are distinguished by the latter being still narrower, and often longer than B. S., and by terminating in an *acute* point *without an oil duct*; different odor and taste. This variety (B. S.) is of a more delicate structure than the others.

The odor of all is strong, and somewhat aromatic; their taste bitterish, and analogous to that of mint. All are smooth, of a dull yellowish green hue, somewhat paler on the under side, on which considerable oil cells are perceptible. All yield a large amount of mucilage when immersed in water, the upper surface swelling. This is due to a layer of mucilage cells under the epidermis of each leaf. The vol. oil is contained in large cells close beneath the epidermis of the under side of the leaf; these oil cells are circular and are surrounded by a thin layer of smaller cells arranged somewhat similar to the oil ducts in the aromatic roots of Umbelliferæ and Compositæ; the latter, however, are elongated. Contains a vol. oil of a mint-like odor. The short var. yields the largest per cent. (1-1.56). On exposure to cold this vol. oil yields Barosma Camphor. The mucilage of buchu leaves is analogous to tragacanth. Bitter principle not isolated.

Serrate, Lanceolate, Varnished Above, White Beneath.

ERYODICTION. { Yerba Santa. Holy Herb.

E. glutinosum. and E. Californicum.

This new drug—used in treatment of rheumatism, pneumonia, bronchitis, laryngitis, and diseases of the mucous membrane, will no doubt take a prominent position in our materia medica as a remedial agent.

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3. MARGIN LOBED.

Tri-Lobed, Reniform-Cordate.

HEPATICA. *H. Americana.* Liverwort.

Stem four to eight inches high; flowers appear before the leaves. Reniform in outline, cordate at base, coriaceous; three lobes, one acute, the other two retuse; upper surface dark, shining green; lower, purplish and hairy. No odor; slightly astringent, mucilaginous taste. The term, liverwort, properly belongs to the cryptogamous genus, Marchantia. Contains Tannin.

Palmate-Lobed, Segments Linear-Lanceolate.

ACONITI FOLIA. *A. napellus.* Monkshood.

Perennial plant, with an erect, round, smooth, leafy stem, about five feet high. The leaves are orbicular in outline, cordate at base, from two to four inches in diameter; deeply divided, almost to base, and these lobes are also divided to the base; thus giving the appearance, particularly the lower leaves, of being nine lobed; above, seven, five or three lobed. The divisions are wedge form, with two or three lobes, which extend nearly or quite to the middle. The final division or segment is lanceolate; the midrib of each lobe is channeled or depressed; petioles generally of same length as blade. When fresh, sub-coriaceous texture, deep green upon their upper surface, light green beneath, and more or less smooth and shining on both sides; when dry, stiff, green, and should be free from mustiness. No odor; bitter, tingling taste. Should be collected when the flowers begin to appear, or shortly before.

A. cammarum and A. neomontanum have broader segments than A. napellus. Taste and medicinal properties are due to *Aconitia* and *Aconitic Acid.* Aconitic Acid is closely related to Citric Acid; same formula, minus one molecule of water. It occurs in the leaves in combination with lime. Aconitia ($C_{30}H_{47}NO_7$) is a yellowish white, scarcely crystalline powder, inodorous, of a bitter and acrid taste, producing numbness of the tongue; unalterable in air; fusible by gentle heat; soluble in 150 pts. cold and 50 pts. boiling water; very soluble in alcohol, ether and chloroform. Neutralizes acids, but its salts are not crystallent. Produces a violet tint with strong phosphoric acid.

4. LEAVES TERNATE.

Leaflets Oblique, Ovate or Rhombic; Terminal Leaflet, Naked.

TOXICODENDRON. *Rhus Toxicodendron.* Poison Oak.

Appears either as a shrub from four to five feet high, or takes root on trees, walls, &c., and climbs to some extent; the erect and climbing varieties have no permanent distinction. The leaves, which stand upon long footstalks, are ternate (in threes), with broad ovate or rhomboidal, acute leaflets, smooth and shining on both sides; sometimes slightly hairy on the veins beneath when young. Entire, or irregularly lobed and toothed (same as oak, from whence the common name); the lateral leaflets are sessile, *terminal one stalked; uneven at base*, clinging by midrib. When wounded they emit a milky juice, which on exposure blackens.

Trilia trifoliata, has many similarities, distinguished by its terminal leaflets being sessile. Inodorous; mawkish, acrid taste. The poisonous properties of the leaves depend upon a volatile acid, known as *Toxicodendric Acid.* Ammonia and permanganate of potassium are employed to counteract their poisonous effect.

Leaflets Sessile, Ovate-Oblong, Narrow.

MENYANTHIS. *M. trifoliata.* Marsh Trefoil.

Leaves always found in water; long petioles, from immerged rhizome. Nearly sessile, ternate, entire, oblong, rather rounded at apex, very smooth; beautifully green on their upper surface, paler beneath. No odor; bitter taste. Its virtues depend on a neuter, bitter principle termed *Menyanthin.*

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5. BI OR TRI PINNATE.

Glaucous-Green, Sections Spatulate, Rhombal.

RUTA. *R. graveolens.* Rue.

Shrubby plant, about three feet high, with several shrubby, branching stems; woody below, green and smooth on the upper branches. The leaves are twice pinnate. These are sub-divided and form spatulate rhombal, entire sections; sub-coriaceous, glaucous-green color; sessile, obscurely crenate, dotted with oil glands. Aromatic odor; aromatic, biting taste. Contains a vol. oil remarkable for its solubility in alcohol (1 to 1). This oil treated with nitric acid yields various acids of the group of the fatty acids, Pelargonic, &c. It is considered as rutylic aldehyd. Yield about 0.5 per cent. Rutinic Acid is analogous to quercitrin.

Gray-Green. Pinnate, Ovate-Oblong, Incised. Acute.

CONIUM. *C. maculatum.* Hemlock.

Branching stem, about six feet high. The lower leaves are tripinnate, more than a foot in length, shining and attached to the joints of the stem by sheathing petioles; the upper are smaller, bipinnate, and inserted at the division of the branches; both have channeled foot-stalks, and incised, acute leaflets, which are deep green above and paler beneath. General outline is lanceolate. Mouse-like odor; bitter, nauseous taste.

Collected at time of flowering. Petioles should be rejected. Should be kept in boxes excluded from air and light. Contains a vol. alkaloid *Conia* $C_8H_{15}N$ (less .01 per cent.), a limpid, yellowish, oily, liquid, sp. gr. 0.89; odor resembling urine of mice. Produces white fumes when brought in contact with HCl; has been made artificially. Also contains *Conhydrina*, which is converted into Conia by abstraction of water.

SABINA. *Juniperus Sabina.* Savine.

The tops of a straggling shrub, three to fifteen feet high, growing in So. Europe. The branches are fasciculated, erect and much subdivided. The leaves are numerous, small, erect, firm, smooth, pointed, dark green, glandular in the middle, opposite, and imbricated in four rows. The ends of the branches, and the leaves by which the branches are covered, are collected for use in spring. When dried, they fade considerably in color. Strong, disagreeable odor; bitter taste. The odor is due to a vol. oil, which it contains to the extent of 2-5 per cent. It has the same composition as oil of turpentine. Tannic and Gallic Acids and resin are also found among its constituents. The oil is nearly colorless or yellow, limpid, strongly odorous, and of a bitterish, acrid taste, of a sp. gr. 0.915. Distilled with water (24) and chloride of calcium (8); it evolves carbonic acid and yields *Chloroform.*

JUNIPERUS VIRGINIANA. *J. Virginiana.* Red Cedar.

The Red Cedar is an evergreen tree, seldom very large. Very similar to J. Sabina; botanically distinguished by the branches being inclined to spread; leaves smaller and in pairs or ternate. The two species also differ in their taste and smell. J. Virginiana having a terebinthinous odor, and a strong, pungent taste. The tops are the officinal portion. Same constituents and medicinal properties as the above.

HERBS.

(FOR DESCRIPTION OF NATURAL ORDERS, SEE PAGE 51.)

ACOTYLEDONS OR THALLOPHYTES.

Leaves consisting simply of Parenchyma.

ORD. ALGACEÆ.

Grow in Water. Some consist of One Cell; A Simple or Branching Cell, or Variously Formed; Thallus, Sporingia, One to Many Cells.

CHONDRUS. *C. crispus.* Irish Moss.

Found on the E. coast of N. Am., W. coast of Europe. Belongs to the family of Cryptogamia. Attached by a disc and elongates, forming a ridge, thallus branches, grows on rocks, propagated by spores. Consists of a flat, slender, cartilaginous frond, from two to twelve inches long, dilating as it ascends until it becomes two or three lines wide, then repeatedly and dichotomously divided, with linear, cuneiform segments, and more or less curled up so as to appear smaller. When fresh, it is of a purplish color; dried, yellowish, with purplish portions. Translucent; no odor; saline, mucilaginous taste. Twenty grs. to one fl. oz. of water forms a jelly. Contains about 80 per cent. of a peculiar pectin called *Carrageenin*.

ORD. LICHENACEÆ.

Lichens are supposed to be Compound Organisms, formed of an Alga, and of a Fungus living upon it as a Parasite.

CETRARIA. *C. islandica.* Iceland Moss.

Found in the Northern latitudes of Europe and America. This is a foliaceous, erect, branching thallus, from two to four inches high, length various, with a dry, coriaceous, smooth, shining, deep and narrow lobed frond or leaf. The lobes are irregularly subdivided, channeled and fringed at their edges with rigid hairs. Those divisions which bear the fruit (apothecia) are expanded. White, grayish or various colored patches, noticed on old logs and rocks; lighter on the under than the upper surface. When dried it is of diversified colors, grayish, brown, and red, in different parts, and looses the green tint. It absorbs water when placed in it, to the extent of a third of its weight, becoming soft and cartilaginous. It ordinarily contains 10 per cent. of hygroscopic water. Inodorous; bitter mucilaginous taste, due to *Cetraric Acid*, or *Cetrarin*, *Lichenin* or *Lichen starch*, is also separated to the extent of 70 per cent; it agrees in composition with starch. Iceland moss also contains Lichenic Acid (identical with fumaric acid), Licheno-Stearic Acid, Oxalic Acid, gum and sugar. The bitterness is extracted by macerating the powdered moss, for six hours, in a weak alkaline solution.

DICOTYLEDONOUS PLANTS.

ORD. RANUNCULACÆÆ.

COPTIS. *C. trifolia.* Gold Thread.

This is a small evergreen with a perennial creeping root, the slenderness and bright yellow color of which has given its common name. The caudex, from which the footstalks and flower stems arise, is invested with ovate, acuminate, yellowish, imbricated scales. The leaves stand on long, slender footstalks, are ternate, with firm, rounded or obovate, sessile leaflets, having an acute base, a lobed and acuminately crenate margin, and a smooth veined surface. Flower stem is slender, round, longer than the leaves, bearing one small white flower, with a very small, sharp pointed bracte beneath it. Dried, and as it appears in commerce, it consists of loosely matted masses of the long, thread-like, orange-yellow roots, frequently mixed with the leaves and stems. No odor; purely bitter taste. The bitterness is due to *Berberina*, of which it contains about 9 per cent. *Coptina*, another alkaloid, has also been found. No tannin or gallic acid is present. C. teeta of China has analogous properties.

RANUNCULUS. *R. bulbosus.* Crowfoot.

Perennial plant, with a solid, fleshy corm, and several annual, erect, round, branching stems, from nine to eighteen inches high. The radical leaves, stand on long footstalks, are ternate or quintate, with lobed and dentate leaflets. The leaves of the stem are sessile and ternate, the upper more simple. Each stem supports several solitary, bright yellow flowers, upon furrowed, angular peduncles. The stem, leaves, peduncles, and calyx are hairy. No odor; acrid taste. The whole plant is pervaded by a volatile acrid principle, which is dissipated by heat or drying, and may be separated by distillation. This principle is composed of *Anemonin* and *Anemonic acid.*

ORD. CISTACEÆ,

HELIANTHEMUM. *H. Canadense.* Frostwort.

Perennial plant, about twelve inches high, with a slender, rigid, pubescent stem, oblong, somewhat lanceolate leaves about an inch in length, and large yellow flowers, the calyx and peduncles of which, as well as the branches, are covered with a white down. Receives its name, from the fact that ice is found adhering to the root stem, in winter. No odor; astringent, bitter, taste. Contains tannin, resin and extractive.

MONOPETALOUS HERBS.

ORD. LOBELIACEÆ.

LOBELIA. *L. inflata.* Lobelia.

One to two feet high, with a fibrous root, and a solitary, erect, angular, purplish, very hairy stem, much branched about midway, but rising above the highest branches. The leaves are scattered, one to three inches long, sessile, oval-oblong, lanceolate, serrate, and hairy; the edge of the leaf bears small white glands. Flowers are numerous, small, axillary, and disposed in leafy terminal racemes. Corolla, pale blue. The segments of the calyx are linear and pointed. The capsule is ovoid, inflated and ribbed, crowned by five elongated sepals, which are half as long as the ripe fruit. This is two-celled and contains numerous small ovate-oblong seeds, having a reticulated surface. Slight odor; persistent, acrid taste. Collected in autumn. The activity of the plant is due to a liquid, volatile alkaloid termed *Lobelina*. This is oily, viscid and transparent with strong alkaline properties, of an odor recalling the plant, and of a pungent, tobacco-like taste. Very poisonous. Decomposed by caustic alkalies. Forms crystallizable salts with acids. *Lobelic acid* is combined with the alkaloid.

ORD. COMPOSITÆ.

ABSINTHIUM. *Artemisia Absinthium.* Wormwood.

Perennial plant, with branching, round, and striated or furrowed stems. Two to three feet high, and panicled at their summit. The radical leaves are triply pinnatifid, with lanceolate, obtuse, dentate divisions; those of the stem, are doubly or simply pinnatifid, with lanceolate, somewhat acute divisions; the floral leaves are lanceolate; all are covered with fine white hairs. The flowers are brownish yellow, hemispherical, and in racemes. Florets of the disc numerous, those of the ray few. Strong odor. Intense bitter, nauseous taste. Gathered during flowering (July or August). Yields a vol. oil of a strong odor, yellowish, sp. gr. 0.97. *Absinthic Acid* (identical with succinic) and *Absinthin* have also been procured. The *absinthe* of the French, consists of alcohol mixed with the vol. oil of wormwood, and oil of anise.

COTULA. *Anthemis cotula.* May Weed.

Annual plant, fibrous root, erect, striated stem, very much branched even to the bottom, about eighteen inches high, and supporting alternate, sessile, flat, doubly pinnated, somewhat hairy leaves, with pointed, linear leaflets. The flowers stand singly upon the summit of the branches, and consist of a central, convex, golden-yellow disc, with white, radial florets. The calyx, common to all the florets, is hemispherical, and composed of overlapping hairy scales. Strong, disagreeable odor; warm, bitter taste. Contains a vol. oil, valerianic and tannic acids. Medical properties similar to those of A. nobilis.

ERIGERON. *E. heterophyllum.* Fleabane.

Biennial plant, with a branching root sending up several erect, roundish, striated, pubescent stems, much divided near the top, and two to three feet high. The lower leaves are ovate, acute, deeply toothed, with long winged petioles; the upper are lanceolate, acute, deeply serrate in the middle, and sessile; the floral leaves are lanceolate and entire; all, except the radical, are beset at their base with a fringe of hairs or bristles. The flowers are in terminal corymbs; the florets of the disc are yellow; those of the ray numerous, very slender, and of a pale blue color.

ERIGERON PHILADELPHICUM. Philadelphia Fleabane.

Perennial, one to five erect stems, about two feet high, much branched at top; the whole plant is pubescent. Lower leaves are ovate-lanceolate, nearly obtuse, fringed with hairs on their margin, slightly serrated, on very long petioles; the upper are narrow, oblong, somewhat cuniform, entire, sessile, and slightly perfoliate; the floral leaves are small and lanceolate. The flowers are numerous, radiate, and in panicled corymbs, erect long peduncles bearing one to three flowers. They resemble the above in color; both appear from June to October. These two species possess identical properties, and are indiscriminately employed. Feeble, aromatic odor, and a bitterish taste. Collected during flowering. These two contain a small per cent. of a viscid, greenish. vol. oil, sp. gr. 0.946, of a penetrating, aromatic odor, and a bitterish, pungent taste. Contains more O. than the oil of E. Canadense.

ERIGERON CANADENSE. *E. Canadense.* Canada Fleabane.

Annual plant; stem about four feet high, covered with stiff hairs, and divided into many branches. The leaves are linear-lanceolate, and edged with hairs; those at the lower part are dentate. The flowers are very small, numerous, white, arranged in terminal panicles. This differs from the other species of Erigeron in having an oblong calyx, the ray florets very minute, and more numerous than the disc-florets, and the seed-down simple. Peculiar, aromatic odor; acrid, astringent taste. Collected during flowering (July and August). Contains bitter extractive, tannin and vol. oil. This is limpid, straw-colored, sp. gr. 0.845; peculiar, aromatic odor, and a mild, characteristic taste. It is supposed to consist of two distinct oils.

EUPATORIUM. *E. perfoliatum.* { Thoroughwort. Boneset.

Perennial plant, with numerous erect, round, hairy stems, about three feet high; simple below, branched into three forks near the summit. The distinguishing feature is the leaves. These may be considered either as perforated by the stem, perfoliate, or as consisting each of two leaves, jointed at the base, connate. In the latter point of view, they are opposite and in pairs; the direction of each is at right angles with the pair above or beneath it. They are narrow in proportion to their length, broadest at their base where they coalesce, gradually tapering to a point; serrate, much wrinkled; paler on the under than the upper surface, and beset with whitish hairs, giving them a grayish-green color. The top pairs are sessile—not jointed at base. Flowers, white and numerous. Faint odor; strong, bitter taste. Contains a peculiar, bitter principle; resin, gum, tannin, vol. oil. Gathered after flowering has commenced. About thirty species within the limits of the U. S.

ACHILLEA. *A. millefolium.* Yarrow.

Perennial herb, about twelve inches high. Characterized by its doubly pinnate, downy, minutely divided leaves, with linear, dentate, mucronate divisions, from which it derives the name of *milfoil;* by its furrowed stem and calyx; and by its dense corymb of whitish flowers, which appear throughout the summer, from June to September. Agreeable, aromatic odor; bitterish, astringent taste. The aromatic properties are strongest in the flower; astringent in the leaves. Vol. oil, bitter extractive, tannin and *Achilleic acid.* The oil is of a beautiful blue color. Sp. gr. 0.9.

SOLIDAGO. *S. odora.* Golden Rod.

Two to three feet high, with a slender, erect, pubescent stem. The leaves are sessile, linear-lanceolate, entire, acute, rough at margin, elsewhere smooth; covered with pellucid dots. The flowers are of a golden-yellow color, arranged in a terminal, compound, panicled raceme. The florets of the ray are ligulate, oblong, obtuse; those of the disc, funnel-shaped, with acute divisions. Flowers from August to October. Fragrant odor; aromatic, agreeable taste. About sixty species of this genus belong to the U. S. Pale greenish vol. oil, tannin.

TANACETUM. *T. vulgare.* Tansy.

Perennial plant, about two feet high, with strong, erect, obscure, six-sided, striated, reddish stems, branched toward the summit. The leaves are alternate, doubly pinnatifid, the divisions of which are notched or deeply serrate. The flowers are yellow, and in dense terminal corymbs. Each flower is composed of numerous florets, the ray florets being very few, pistillate and three-cleft; the disc florets are perfect and five-cleft. The calyx consists of small, overlapping, lanceolate leaflets. Strong, fragrant odor, diminished by drying; bitter, aromatic taste. Contains a yellowish, vol. oil, to the extent of about .7 per cent., of a sp. gr. 0.91. Bitter extractive, tannin, gallic and *Tanacetic acids.* The latter is said to have anthelmintic properties similar to santonin.

ORD. URTICACEÆ,

CANNABIS AMERICANA. American Hemp.
C. sativa.

CANNABIS INDICA. Indian Hemp.
C. sativa Var. Indica [Female Plant].

Hemp is an annual plant, about six feet high, with an erect, branching, angular stem. The leaves are either alternate or opposite, situated on long, loosely formed petioles, harsh, borne on the apex of the petiole, with 5 to 7 linear-lanceolate, serrated divisions, with awl-shaped stipules. The flowers are axillary; the male in long, branched, drooping racemes; the female in erect, simple spikes; more crowded in the var. Indica. Fruit is ovate and one seeded. The whole plant is covered with a scarcely visible pubescence, somewhat viscid to the touch. The two varieties are hardly distinguishable, therefore termed var. Indica and var. Americana. The Indian contains a large per cent. of resin. The bast fibres of both are used in making "hemp."

C. I. occurs in commerce in small branches, pistillate, collected when fructification takes place; contains considerable amount of resin which has exuded. These branches are formed in bundles; brittle and of a glutinous appearance, brownish-green, and known as Gunjah. The leaves, small stalks, and capsules are dried separately, and known as Bhang, Hashish. Gunjah, is the entire upper part of the branches of the female plant, formed in bundles, from six to twelve inches long, sometimes only a few inches; about three inches in diameter. Men clothed in leather run through the hemp fields brushing forcibly against the plants, separating the resin; this is called Churrus, and is in brown, earthy looking, compact, friable, large, irregular masses; not used in this country. The herb has a peculiar, strong odor when fresh; dried, not strong, but heavy and narcotic. Slight bitterish, acrid taste. The *Resin* and *Vol. Oil* are its most interesting constituents. The former (*Cannabin*) is a brown amorphous solid; burning with a bright white flame and leaving no ash. Very potent action, $\frac{2}{3}$ of a grain acting as a powerful narcotic. Soluble in absolute alcohol, but not in cold alcohol of 89 to 90 per cent., and separated from solution by water as a whitish precipitate. Also soluble in ether, acetic ether, chloroform and carbon bi-sulphide. Insoluble in liquor potassa. Treated with Nitric Acid yields an orange-red butter. Bitterish, acrid, somewhat balsamic taste; fragrant odor, especially when heated. By distillation, the vol. oil is obtained, together with ammonia (0.3 per cent.) This oil is amber-colored, and of an oppressive odor. It sometimes deposits an abundance of small crystals. By care, it may be separated into two bodies. *Cannabene*, liquid and colorless; the other *Hydride of Cannabene*, solid, platy crystals.

ORD. GENTIANACEÆ.

CHIRETTA. *Agathotes Chirayta* Chiretta.

Chiretta is an annual (sometimes biennial) plant, about three feet high, with a nearly simple root with few fibres, from two to four inches long, about one-half inch thick, and with one (or occasionally two or more) erect, smooth stems, containing a yellow pith; round at lower and middle part, obtuse quadrangular at upper, two to three lines thick, orange-brown, sometimes dark-purple color, jointed at intervals of one and a half to four inches, branching into an elegant leafy panicle, furnished with opposite, embracing, lanceolate, very acute, entire, smooth, three to five-nerved leaves, from a half to one inch long. Flowers are numerous, in a large panicle; at each division of the panicle there are two small bracts. The yellow corolla is rotate, four-lobed, with glandular pits above the base; the calyx is one-third the length of the petals, which are about one-half an inch long. The one-celled, bi-valved capsule contains numerous seeds. Collected when the capsules are fully formed. Odor slight when fresh; dry none; but when moistened is obvious. The taste is strong, persistent bitter, devoid of astringency. *Chiratin* and *Ophelic Acid* are its bitter principles. The latter occurs in the largest proportion, amorphous, viscid, yellow, acidulous substance, of a persistent bitter taste, and faint odor. It does not form an insoluble compound with tannin; soluble in water, alcohol and ether. The former is removed by means of tannin; neutral, not distinctly crystalline, yellow, hygroscopic powder, soluble in alcohol, ether and warm water. Decomposed by boiling HCl into *Chiratogenin* and ophelic acid. No glucose formed by this decomposition.

SABBATIA. *S. angularis.* American Centaury.

Annual or biennial plant, fibrous root, and a sharply quadrangular, erect stem, smooth, simple below, opposite axillary branches above, about eighteen inches high. The leaves are from one-half to one inch long, ovate, inclined to be oblong, entire, recurved on the stem. The flowers are numerous, growing on the ends of the branches. The corolla is bright red. Collected during flowering No odor; strong, bitter taste; devoid of astringency. Bears a close resemblance to Erythrœa Centaurium, or European centaury, and contains analogous constituents, *Erythro-centaurin.*

ORD. LABIATÆ.

MENTHA PIPERITA. *M. piperita.* Peppermint

MENTHA VIRIDIS. *M. viridis.* Spearmint.

All species of Mentha are united by intermediate forms. The two above differ, in M. piperita having a purplish stem, leaves stalked, ovate and sharply toothed; flowers collected in a cyme at the top to form a terminal, compact, obtuse spike. In M. viridis, the stem is green; the leaves are sessile, and lanceolate; flowers arranged in a sharp pointed spike, the lower, some distance from each other. Both are perennials, and about two feet high. The taste, is a good characteristic of the mints. M. crispus employed in Europe, possesses similar properties. Collected in August. The pure *oil of spearmint* is distilled only in this country; the so-called oil of spearmint of Europe is obtained from M. crispus, but both are very similar. This is of a pale yellowish-green when fresh, but becomes red and finally brown with age, sp. gr. 0.914, freely soluble in alcohol, 85 per cent. Contains a considerable amount of stearoptene (isomeric with carvol) to which the odor is due. *Oil of peppermint* is yielded to the extent of 1 per cent. Considerable difficulty is found in distilling it, as Erigeron and other odorous plants grow with it, and are often distilled indiscriminately. It is a pale yellow or greenish liquid, sp. gr. 0.84 to 0.92. Strong, agreeable odor, increasing with age; powerful, aromatic taste, followed by a sensation of cold when air is drawn into the mouth. The odor is due to *Menthol* (Peppermint Camphor). Chinese Oil of Peppermint consists of this. It is crystallent, resembling sulphate of magnesia, and often adulterated with it Adulterations of the oil, with Ol. Terebinth., detected by the pure oil being soluble in its own weight of 85 per cent. alcohol, forming a perfectly clear solution with three times its weight, and turbid with a larger per cent.; if Ol. Terebinth. is present it will not yield a clear solution with three times its weight or in any proportion. Nitric acid turns the pure oil greenish-blue. Anhydrous chloral produces a green or red color when brought in contact with the pure oil.

MELISSA. Balm.

M. officinalis (*Var. Citrus adoris, Maisch*).

Perennial, about eighteen inches high, erect, quadrangular stems, usually branched towards the base. The leaves characterize this plant. They are broad-ovate, crenate and pubescent, the lower on long footstalks, the upper nearly sessile. The flowers are white or yellowish, upon short peduncles, and in axillary whorls, surrounding only half the stem. When fresh, of a fragrant lemon-like odor, diminished on drying; harsh, slightly aromatic taste. Collected in July. Contains .04 to .3 per cent. of a yellowish or reddish-yellow vol. oil, of a strong odor; sp. gr. about .91; soluble in 5 parts alcohol. Also contains tannin.

HEDEOMA. *H. Pulegioides.* American Pennyroyal.

Annual plant, from six to twelve inches high; stem pubescent, decumbent and very much branched near the base. The leaves are petiolate, opposite, narrow, lanceolate, remotely serrate, rough or pubescent, and prominently veined on their under surface, dotted with oil glands above and below; less than an inch in length. The flowers are small, and of a pale blue color, arranged in a series of dense globose whorls, extending considerable distance up the stem. Characterized by its odor and taste. *Oil of pennyroyal* is of a light yellow color, with the odor and taste of the herb. Sp. gr. 0.948.

CATARIA. *Nepeta Cataria.* Catnip.

Perennial, sharply quadrangular, hoary stems, about two feet high. Leaves with foot-stalks, cordate at base, dentate, lower surface woolly, greenish above. The flowers are whitish, or slightly purple, and are collected in glomules at the apex of the stem, teeth of the calyx sharp. Peculiar odor; pungent, bitter, camphorous taste. Vol. Oil and tannin are its constituents.

SCUTELLARIA. *S. lateriflora.* Scullcap.

Perennial, stems quadrangular, smooth, erect, and much branched, about eighteen inches high. Leaves ovate, dentate, acute, subcordate on the stem, opposite, on long petioles. Flowers small, pale blue, and disposed in long, lateral, leafy racemes. The tube of the corolla is elongated, the upper lip concave and entire, the lower three-lobed. No distinct taste or odor.

MARRUBIUM. *M. vulgare.* Horehound.

Perennial, stems numerous, quadrangular, erect, woolly, about fourteen inches high. Leaves circular, crenate, white and woolly, wrinkled, veined, on long foot-stalks, in pairs. The flowers are white, and in crowded axillary whorls. The calyx is tubular, and divided at the margin into ten narrow divisions, which are hooked at the end. The corolla is also tubular, upper lip bifid, under reflected and trifid, middle division broad and slightly scalloped; strong, rather agreeable odor, lost on drying; durable, bitter taste. Contains *Marrubin*, a small amount of vol. oil, resin and tannin.

MONARDA. *M. punctata.* Horsemint.

Perennial, stems downy, whitish, branching, obtusely angled, and about eighteen inches high. Leaves oblong-lanceolate, serrate, smooth, punctate. Characterized by the large number of lanceolate, green colored bracts, with purple blotches, and being longer than the cymes. The flowers are arranged in numerous cymols; corolla yellow with purple blotches. Aromatic odor; pungent, bitterish taste. Contains a reddish-amber vol. oil, of a fragrant odor, and a warm, very pungent taste. Crystallizes at a low temperature, and is analogous to thymol.

ORIGANUM. *O. vulgare.* Mountain Mint. Majoram.

Perennial, stems erect, purplish, downy, quadrangular, three-forked; about eighteen inches high. Leaves opposite; ovate, entire, hairy, deep yellowish-green. Flowers reddish; disposed in roundish, panicled spikes. The plant is characterized by the red color of its top. Agreeable, aromatic odor; warm, pungent taste. Yields 1 to 5 per cent. of a vol. oil of a reddish tinge; odor of the plant, hot, acrid taste; sp. gr. 0.87. Turbid solution with 16 parts alcohol. This oil is superseded in commerce by the oil of thyme.

LYCOPUS. *L. Virginicus.* Bugle Weed.

Perennial, creeping root. Stem erect, simple, nearly quadrangular, about fourteen inches high. Leaves opposite, sessile, broad-lanceolate, attenuated and entire at both ends, serrulate in the middle, purplish, somewhat rough, and crowded with glandular dots on their under surface. Flowers minute, and in small axillary whorls; white corolla. Peculiar odor; nauseous, slightly bitter taste. L. Europæus, which is often collected and sold for L. Virginicus, may be distinguished by its acutely quadrangular stems, narrow, lanceolate leaves, lower, somewhat pinnatifid, and its more crowded flowers. Contains *Lycopin?*

THYMUS. *T. vulgaris.* Thyme.

Low undershrub, procumbent at the base, with ovate linear, revolute leaves, and flowers in a whorled spike. Aromatic odor; camphorous taste. The vol. oil only is officinal; this has been ascertained to be the source of the so-called Ol. Origanum. Yields about 1½ per cent. After one distillation it is of a reddish-brown color, and is known as *red oil.* By re-distillation it becomes colorless; then known as *white oil.* The former is what is found in commerce; this is of a somewhat disagreeable odor; sp. gr. about .905, but probably varies, as the oil is a complex body, containing *Thymol* or *Thymic Acid* (analogous in properties and composition to creasote and carbolic acid) and *Thymene.* The oil is soluble in 1 part of alcohol.

FLOWERS AND PARTS OF FLOWERS.

1. BUDS.

Oblong, Brownish, Green Scales, Imbricate.

SANTONICA. *Artemisia Cina.* Wormseed.

The precise species from which this is derived is not exactly known, attributed to A. Cina (U. S. P.) Persia. A. panciflora, Russia. A. Ramosa, N. W. Africa. A. Stechmannianæ, S. E. Europe. Levant wormseed of commerce, consist of minute flower-heads, about a line in length, and nearly half a line in breadth (requires 90 to weigh one grain), fusiform, blunt at each end, pale greenish-brown, smooth; resembling seed in appearance, but consisting of fifteen to eighteen small, imbricated scales, with a green midrib; the lower scales are much shorter than the upper, thus giving the lower part of the flower a shorter appearance; the odor resides in the green midrib of the scales; these scales enclose four or five tubular florets, so minute that they can hardly be distinguished. Flower-heads, not round or hairy. Strong odor (due to small quantity of vol. oil). Bitter, camphoraceous taste. Santonica yields about 1 per cent of vol. oil, of a characteristic smell and taste, but devoid of anthelmintic properties; it consists of Cinnæbene-Camphor. The substance to which the action of wormseed is due, is *Santonin* ($C_{15}H_{18}O_3$); this constitutes about 2 per cent. of the drug, and is easily extracted by milk of lime. It occurs in colorless, rectangular tabular crystals, which, when exposed, assume a yellow hue (but the change in color does not effect its virtues). Insoluble in cold water or weak acid solutions, soluble in 250 pts. boiling water, 43 pts. cold, and 3 boiling alcohol, and in 75 pts. ether. Scarcely any taste alone, very bitter when combined with an alkali. Santonin is the anhydride of *Santonic Acid.*

Oblong, Brown, Calyx Cylindrical, Four-Parted, Corolla Globular.

CARYOPHYLLUS. *C. aromaticus.* Cloves.

Small pyramidal tree, always green, and ornamented with a succession of rosy flowers throughout the year. The flowers are arranged in terminal corymbose panicles. They are collected for use before expansion. The red or pink calyx acquires a brown color on drying; the calyx is cylindrical, a quarter to half an inch in length, tapering at base, closely united with the ovary and forming four prongs; these are situated around a ball, composed of four petals in the centre. Large number of oil glands on the calyx. Deep brown externally; internally, reddish. The best have an oily appearance; strong, fragrant odor; strong, aromatic, pungent taste. When light, soft, wrinkled, pale and of little odor and taste, they are inferior. Contains a peculiar tannin (13 per cent.), resin and vol. oil. The vol. oil it contains to the extent of about 18 per cent., requires frequent cohobation to extract it all; it is colorless or yellow, with a powerful odor and taste of cloves; sp. gr. 1.046. It is a mixture of a hydrocarbon, and an oxygenated oil called *Eugenol*. The former (*light oil of cloves*) has the composition of turpentine. Eugenol or *Eugenic Acid* is isomeric with Cuminic Acid, and yields crystallizable salts. *Eugenin* and *Caryophyllin* are also found. The oil assumes a greenish-blue hue when mixed with Tr. Fer. Chlor.

2. PETALS.

Pale Red, Round, Obovate, Emarginate, Claw Yellow.

ROSA CENTIFOLIA. Pale Rose.

Deep Purple, Round, Obovate, Emarginate, Claw Yellow.

ROSA GALLICA. Red Rose.

These are cultivated over the entire civilized world, and a great many hybrids have sprung from the above two. These are so closely allied, even in their wild condition, that they are considered by a great many botanists, to be varieties of one species. The main distinction is, that the petals of R. centifolia are pale red, and those of R. Gallica deep red, almost purple; in all other respects, they resemble each other very closely. The petals are sharp, round, apex marginate, base contracted to a claw, and this is generally of a yellow color. Both possess the same agreeable odor, taste sweetish, and slightly astringent. The coloring matter is peculiar; an infusion is pale red, but becomes of a brilliant crimson if an acid is added; an alkali will change either the simple or acidulated infusion to a bright green. R. centifolia, always collected while flowers are in full bloom; used immediately or salted. R. Gallica collected before the flowers have fully expanded; less odorous than the above. The first is used on account of its odor, the latter in pharmaceutical preparations. Both contain *quercitrin* (yellow color ing matter.– The *volatile oil* (*attar*, *otto*,) is not obtained from either of the above; their yield being too small, and the odor not exactly suited. Obtained from R. Damascena, and the yield of this is only about 0.04 per cent. This volatile oil is distinguished from all others, by its stearoptene being the hydrocarbon and the liquid portion oxygenated. Congeals at 50° to 60° F., sp. gr. 0.87 to 0.89. The odor resides exclusively in the liquid portion, the stearoptene, when pure, is entirely odorless. Spermaceti is sometimes used to adulterate the oil; this is detected by its congealing at 50° to 60° F. in a mass, while the stearoptene of oil of rose congeals in crystals; this stearoptene is also soluble in alcohol (85 per cent.) the fats, &c. The congealing point differs according to the country in which the roses have been grown, the state of weather when gathered, &c. The oil obtained from W. Turkey congeals at a much higher temperature than that obtained from other sources.

Deep Purple, Roundish, Thin, Claw Black.

RHŒAS. *Papaver R.* Red Poppy.

The red poppy is distinguished by its hairy stem, which is branched, and rises about a foot in height, by its incised pinnatifid leaves and the full, bright, purple, roundish petals, which are thin, with their base contracted to a black claw. Fresh, narcotic odor, loses on drying; mucilaginous, bitter taste. Its most important constituent is a coloring matter, consisting of *Rhœadic* and *Paparic Acids.* No alkaloids of Opium present.

Yellow, Ligulate, Three-Toothed.

CALENDULA. *C. officinalis.* Marygold.

Peculiar, rather disagreeable odor, lost on drying; rough, bitter, saline taste. Contains *Calendulin—a principle analogous to Bassorin.*

3. STIGMAS.

Three-Cleft, Tubular, Enlarged and Toothed Above.

CROCUS. *C. sativus.* Saffron.

Low plant, three to four inches high, with a rounded corm, from which the flower rises, upon a slender, white, succulent tube. The flower is large, of a bluish-purple color, and appears in autumn. The leaves are radical and linear. The style hangs out on one side between the two divisions of the corolla, and terminates in three long, convoluted stigmas. These are collected in the morning; requiring from fifty to sixty thousand to make a pound. The style is of a bright yellow color, but where it branches to form the stigmas (three) it is reddish; the stigmas are filiform in shape, an inch in length, toothed at apex, and rolled in at the edges. When fresh, of a rich orange color; dry, they acquire the peculiar brown color. Peculiar, aromatic odor; warm, pungent taste. It is scarcely employed now for its medicinal properties. Owing to its high price, it is frequently adulterated. The most common of these are the styles, which may be distinguished by their lighter color; old saffron, and that deprived of its coloring matter is oiled; this is detected by pressing on paper, and noticing the stain if any; the flowers of Carthamus, Calendula, and Arnica are often used. These may be known by their shape, which is readily discerned by throwing a portion of the suspected mass in hot water, which causes them to expand; prepared chalk, fluor spar and gypsum are employed (sometimes to the extent of 20 per cent.), by moistening the stigmas with honey, and when dry, putting on the powder; detected by placing in water, the saffron will float and the powder subside; this may be tested with HCl.

Two vol. oils may be obtained from saffron, one of which is identical with Oil of Caraway (carvol). Its coloring principle is termed *Polychroit* on account of the various colors it assumes with reagents; it is naturally red; when added to water, becomes yellow; with nitric acid, green; and with sulphuric acid it is decomposed into *Crocin*, (a red, insoluble powder) and glucose.

4. EXPANDED FLOWERS.

Calyx None; Corolla Tubular; Five-Toothed; Red.

CARTHAMUS. *C. tinctorius.* Safflower.

About eighteen inches high, with a smooth, somewhat branched, erect stem; the flowers are compound, in large terminal, solitary heads. The florets are orange-red; ray florets strap-shaped; no calyx; tubular corolla, the border of which is divided into five equal lanceolate, narrow segments; stamens united by their anthers. Peculiar, aromatic odor; slight, bitter taste. Contains two coloring substances—one red, insoluble in water, and called *Carthamine* or *Carthamic Acid;* the other, yellow, and soluble in water. The former, mixed with talc, forms *rouge.*

Involucre in Two Rows; Ray Florets Ligulate; Yellow; Pappus Hairy

ARNICA. *A. montana.* Leopard's Bane.

The stem is about a foot high, round, channeled, hairy, and ends in one or more peduncles, each having a single orange-yellow flower. The flowers are about an inch in length, and three-fourths of an inch or so in diameter; the calyx is greenish, imbricated with lanceolate scales, The ray florets are strap-shaped, and consist of about fourteen; these are double the length of the calyx, striated, three-toothed, and hairy at the base; the disc is composed of tubular florets, with a five-lobed margin. The long and hairy pappus gives it a characteristic appearance. Peculiar, disagreeable odor; persistent, acrid taste. Contains a small per cent. of a blue vol. oil, and also *Arnicine.* This is in soft, golden yellow amorphous masses, of an acrid taste. It has not been proven as yet, to be a glucoside, although it is decomposed by dilute acids.

Involucre Equal; Ray Florets White; Receptacle Conical; Chaffy.

ANTHEMIS. *A. nobilis.* Chamomile.

About nine inches high, with round, slender, downy stems, branching upwards. The flowers are solitary, almost spherical, with a yellow, convex disc, and white rays. The calyx is hemispherical, composed of several small overlapping, hairy scales, and is common to all of the florets. The receptacle is conical, prominent and chaffy. The ray florets are numerous, narrow, and furnished with three small teeth at the apex. Similar, in appearance, to common or dog chamomile. Peculiar, aromatic odor; aromatic, bitter taste. Collected solely from cultivated plants. By cultivation the yellow disc florets are often converted into the white ray florets; they are then termed double; the unchanged single. The former are generally preferred; the latter are the most powerful, but as the conversion is more or less complete, both varieties appear intermingled in commerce. The superiority of the ray florets, consists of the finer aromatic flavor. Should be well and quickly dried; the whitest should be preferred. Their appearance may be improved by placing them in a sieve a convenient distance from steam heat. The flowers yield about 0.2 per cent. of vol. oil, which is at first pale blue, but becomes yellowish-brown on long exposure. Sp. gr. .90. The oil is regarded as a mixture of butylic and amylic angelate, and valerate, which bodies are easily decomposed by an alkali. The oil obtained from the entire plant is greenish. It also contains a brown, bitter extractive, probably a glucoside.

Involucre Imbricate; Ray Florets White; Receptacle Naked, Hollow.

MATRICARIA. *M. Chamomilla.* German Chamomile.

Branching stem, about a foot high. The flowers appear singly at the ends of the stem and branches. They are about three-quarters of an inch in diameter, with spreading rays. Very similar, in appearance, to the Roman; the main distinction is the hollow, conical receptacle, single row of ligulate ray florets, and smallness of the German. Odor the same; taste less bitter. Collected invariably from wild plants. Its active constituents are vol. oil and bitter extractive. The oil is of a deep blue, and is distinct from that of A. nobilis. It congeals at -4° F.

Involucre Imbricate; Ray Florets Rose Red; Receptacle Flat, Naked.

PYRETHRUM. *P. Parthenium.* Pellitory.

The flowers of Parthenium are sometimes sold for chamomile. The odor and taste are analogous to those of chamomile, and it also resembles them in the appearance of their flowers and in medicinal virtues. They are distinguished, by their smaller receptacles, which is flat and naked, and their rose-red ray florets. Yields a small per cent. of vol. oil. Two other species, P. roseum and P. carneum have come into use, as the source of the Persian insect powder.

Calyx Inferior, Blue; Corolla Two-Lipped, Blue; Stamens, Four.

LAVANDULA. *L. vera.* Lavender.

Shrubby plant, one to two feet high, divided into many slender, pubescent, quadrangular branches. The flowers are small, arranged in whorls, forming cylindrical spikes, the lower being interrupted. The calyx is lip-shaped, with thirteen nerves from base to apex; wooly, blue-gray. The corolla is steel-blue, and also lip-shaped. Strong, fragrant odor; warm, aromatic taste. Mostly cultivated for its volatile oil; stem also used for this purpose. Oil of Spike (genuine) is obtained from the broad leaf variety (L. spica), which is closely allied to L. vera. The only constituent of any importance is the vol. oil. This is a pale yellow, mobile liquid, varying in sp. gr., from 0.87 to 0.94, having a very agreeable odor and a strong, aromatic taste. The yield is about 1½ per cent. It is a mixture of various hydrocarbons and stearoptene. When obtained from the flowers and stem it has a less agreeable odor.

Calyx Superior, Small; Corolla Rotate, Five-cleft, Cream-colored; Stamens Five.

SAMBUCUS. *S. Canadensis.* Elder.

Suffructicose, six to ten feet high. Closely allied to S. nigra of Europe, differs in the latter being much larger, similar in all other respects. The inflorescence is cymose, with five divisions; the flowers are small, and when fresh, white, when dry, cream-colored, the outer flowers are more or less radiate; the corolla is wheel-shaped, five-cleft; calyx five-parted; five stamens on the tube; one style which produces a single, deep-purple, three-seeded berry. Mild, agreeable odor; aromatic taste. Collected when partly opened. Odor due to a small quantity of vol. oil which is present. Mucilage, sugar and gum are also found.

Calyx Inferior, Wooly; Corolla Rotate, Five-cleft, Yellow; Stamens Five.

VERBASCUM. *V. thapsus.* Mullein.

About four feet high, with a rigid, hairy stem, and large, wooly leaves. The flowers are collected in long dense spikes. The corolla is only employed; this is rotate, five-cleft, large, and of a bright yellow color; the calyx is five-lobed and wooly; slight odor, mucilaginous taste. Demulcent.

Calyx Inferior, Small; Petals Five, White, Oblong; Stamens ∝.

AURANTII FLORES. Orange Flowers.

Citrus Aurantium and Citrus vulgaris.

The flowers are collected solely for the volatile oil, best collected before fully expanded. At this period they have a tubular appearance, caused by the very small calyx with five small teeth, and saucer-shaped, being situated on the corolla; corolla has five petals, which are white and oblong, and covered with oil glands. They appear singly or in clusters; when fresh, white; dry, greenish-yellow. Retain their fragrant odor for some time. Contains several volatile oils, the most agreeable portion of which is soluble in water, the other less so. The vol. oil yielded by the flowers is known as *oil of neroli*. As found in commerce it is seldom pure, generally being mixed with the vol. oil of the leaf (*oil petit grain*). Pure oil of neroli is of a brownish hue, very fragrant odor, bitterish aromatic taste, and of a sp. gr. of 0.889. When mixed with alcohol it displays a bright violet fluorescence. It assumes a permanent crimson color if mixed with a solution of bisulphite of sodium. It deposits a very small portion of neroli camphor.

Panicles Large, Unisexual; Sepals ten, in Two Rows; Petals Minute; Carpels Two, in Calyx Tube.

BRAYERA. *B. anthelmintica.* Koosso.

Tree about sixty feet high, growing in Abyssinia; the branches show round scars, left by the fallen leaves. The entire inflorescence is used; this is of two kinds, pistillate and staminate. These resemble each other very much when young; the general shape is a zig-zag or flexuous, central axis, which branches very much alternately. The calyx consists of two rows of minute sepals, five in each row. Corolla consists of five petals, inserted in the throat of the calyx, small, linear. Two carpels at bottom of calyx, free, one-celled. After fructification, the pistillate becomes leaf-like, and of a rosy tint; the staminate never occurs alone in commerce, but is mixed with the pistillate; the pistillate generally occurs alone. The dried flowers are in unbroken though compressed clusters. The general color of the mass is yellow. Peculiar mild odor in the natural state; mild, then an acrid taste. The activity is due to *Koussin*, which is prepared in the same manner as santonin, and yields about six per cent. This occurs in rhombic crystals of a yellow color, tasteless, and readily soluble in chloroform and ether, nearly insoluble in alcohol, and quite so in water. It is not decomposed by boiling dilute acids. An oil having traces of valerianic and acetic acids has also been separated. Tannin to the extent of 24 per cent is also present.

FRUITS AND PARTS OF FRUITS.

1. PSEUDO FRUITS.

Berry-Like ; Three-Seeded; Aromatic.

JUNIPERUS. *J. communis.* Juniper.

Small tree or shrub, with numerous very close branches. The inflorescence forms a small cone; these are made of open pistils, in the form of flat scales, regularly overlaying each other, and pressed together in a head, each scale bearing one or two naked seeds on its inner side. In the Coniferæ family generally, they are dry, and the scales turn backwards, but in the Juniper the few scales of the very small cone become fleshy, and ripen into a fruit which is commonly known as a berry. This is globular, more or less shrivelled, about as large as a pea, triangularly marked at the summit, showing the union of the parts; and with few small scales at the base, remnants of undeveloped whorls; they contain a brownish-yellow pulp, and three angular seeds; these seeds are covered with oil glands. It takes two years for them to ripen, up to which time they are of a green color, now covered with a blue gloom, beneath which they are of a shining, blackish-purple color. Agreeable, aromatic odor, and a sweetish, warm, slightly terebinthinate taste. They are largely used in the preparation of gin, and contain 1 to 2 per cent. of a light and colorless vol. oil. Same composition and behavior as oil of turpentine. The oil of Juniper of commerce is obtained from the branches and wood. They also contain Juniperin a yellow resin, and sugar.

Strobiles; Bractes Leafy, Granular.

HUMULUS. *H. Lupulus.* Hops.

Climbing plant. Obtained solely from cultivated plants, of which various varieties have been propagated. Used for many centuries in the manufacture of malt liquors. The flowers are numerous, axillary, and furnished with bracts; male are yellowish-white, and disposed in open clusters; female grow on distinct plants, are pale green, and arranged in solitary, peduncled catkins, composed of thin, translucent scales, ovate, acute, and tubular at the base; each scale bears near its base, on its inner side two flowers. The catkins are converted into ovate, membranous cones or strobiles, each scale of which contains two small seeds, surrounded by a yellow, granular powder (Lupulin), at its base. Hops consist of numerous membranous, leaf-like scales, of a pale greenish-yellow color, and contain two small, round, black seeds near the base. Brittle when dry, but hard to powder. Strong, peculiar, somewhat narcotic odor; bitter, astringent taste. The leafy portion of the hops only contains tannin, 4 to 5 per cent. Exposed to the air, the odor of *Valerianic acid* is developed.

Pyriform, Fleshy, Saccharine.

FICUS. *F. Carica.* Figs.

Small tree; large number of varieties have been produced. The fig is simply the receptacle. This is pyriform and fleshy; the real fruit are the seeds it contains. Of a whitish, yellow, or red color. Contains a milky juice before ripening, and is of an acrid taste. When ripened it is filled with a sweet viscid pulp, and is of a sweet, mucilaginous taste; fruit-like odor. Dried by the heat of the sun or in ovens. Covered externally with an exudation of sugar. They contain 60 to 70 per cent. of sugar, and a small quantity of mucilage.

Club-Shaped, Spikes of Valesced, One-Seeded Berries.

PIPER LONGUM. *P. officinarum.* Long Pepper.

This species of Piper differs from the others in having its flowers in dense, short, nearly cylindrical spikes; and its fruit, consisting of very small one-seeded berries, embedded in a pulpy matter. Of a green color when not ripe, red when mature; collected in the former state, as it is then more fiery. The whole spike is taken and dried in the sun. The spikes (commonly called long pepper) are club-shaped, about an inch and a half in length, indented on its surface, of a dark-gray color, a weak aromatic odor, and a pungent, fiery taste. Same constituents and virtues as P. nigrum.

2. SMALL DRUPES AND BERRIES.

Superior, Black Purple, Ten-Celled; Ten-Seeded.

PHYTOLACCÆ BACCA. *P. decandra.* Poke Berry.

The flowers are numerous, small, and in long racemes, which are either erect or drooping. The raceme of flowers becomes a cluster of green, then dark purple, shining berries; these are round, ten-celled, ten-seeded, imbedded in a succulent pulp, and also contain a large quantity of purple juice, which is bleached by exposure. No odor; sweetish, nauseous, acrid taste; also contains sugar and an evanescent coloring principle.

Superior, Red, Wooly, One-Seeded.

RHUS GLABRUM. *R. glabrum.* Sumach.

Plant about eight feet high, divided into straggling branches covered with a reddish bark. The flowers are yellowish, and collected in large, erect, compound, dense panicles, which are succeeded by clusters of small dark-red berries, covered with a silky down, containing one large bone-like seed. No odor; of a sour, astringent taste, due to *Malic acid* and *acid Malate of Calcium.*

Superior, Black or Greenish, Four-Celled, Four-Seeded.

RHAMNUS. *R. catharticus.* Buckthorn.

These, when ripe, are as large as a pea, round, black, smooth, shining, with the seeds in a green, juicy parenchyma. They resemble Cubebs to some extent; distinguished by being four-celled, and each cell containing one seed; by having a short projection at apex; base flattened to a disc, the remnant of the calyx; and the footstalks (pedicle) not belonging to the fruit, as in Cubebs. No odor; sweet, then acrid taste. They contain *Rhamnocathartin*, sugar, malic acid, &c.

Superior, Brown-Black, Wrinkled, Tailed, One-Seeded.

CUBEBA. *C. officinalis. Piper Cubeba.* Cubebs.

Shrubby plant. The fruit of the peppers are all berry-like. When ripe they are of a red color, but as they appear in commerce, of a brown or black color, due to their being collected in the unripe state, and then dried. Cubebs are globular, of a blackish or brownish color; when first formed they are sessile, then raised on a stalk, (base of the pericarp elongated), which is continuous with raised veins that run over the surface of the berry, embracing it like network; this stalk is longer than the fruit, not a pedicle. Size of a pea, shrivelled, or more or less reticulate, due to shrinkage of the sarcocarp; the shell (pericarp) is hard, almost ligneous, and encloses chiefly a cavity, or one shrunken seed, with a blackish coat, and internally white and oily. The vittæ of the seeds contain the volatile oil. Aromatic odor; aromatic, peppery taste. Used in their native country as a spice. C. canina (E. I. Islands), fruit identical with C. officinalis, differs in the stalk being shorter than the fruit. Contains 5 to 15 per cent. vol. oil, greenish, becoming yellow with age, also *Cubebin* and *Cubebic acid.*

Superior, Black, Wrinkled, One-Seeded.

PIPER. *P. nigrum.* Black Pepper.

Climbing shrub. The inflorescence is the same as in Cubebs, but after fructification the fruit remains sessile; collected when green, dried by exposure to air. Similar in appearance to Cubebs (without stalk), externally blackish, wrinkled pericarp; sarcocarp underneath; the hard endocarp consists of one shrunken white seed; the central portion forms a cavity near the base, where is situated the small and undeveloped embryo. Aromatic odor; sharp, burning, acrid taste. 1 per cent. vol. oil, 3 to 4 of *Piperina;* the latter when perfectly pure is colorless and tasteless, the burning taste due to resin.

Piper album, or white pepper, is the ripe berry deprived of its pericarp by maceration in water and then rubbing, and afterwards dried in the sun; the endocarp furnishes the white shell; usually a little larger than P. nigrum; about ten distinct lines run from base to apex; when opened, no cavity, but a white seed or albumen is noticed. Same constituents as above.

Inferior, Brown, Granular, Two-Celled, Two-Seeded.

PIMENTA. *Eugenia Pimenta.* Allspice.

Tree about thirty feet high. The fruit is a globular berry, crowned with a persistent calyx. They are gathered after having attained their full size, but while yet green, and dried in the sun. They are about the size of a pea, the pericarp is brown, wrinkled, and granular; sarcocarp beneath; the endocarp consists of two cells, each cell containing one seed, placed plano-convex against each other. Aromatic odor; warm, aromatic taste. Myrcia acris furnishes a closely allied berry, differs in being more elongated, not strictly globular, and in having a larger number of seeds. Contains 6 to 8 per cent. vol. oil, fat, resin and tannin. Vol. oil chemically identical with oil of cloves.

3. LARGE DRUPES, SUPERIOR, ONE-SEEDED.

Reniform, Blackish, Hard, Bitter.

COCCULUS. *C. Indicus.* Fish Berries.

Climbing plant (very high). The fruit is about as large as a pea, of a peculiar reniform shape, the base at one end of the sinus, the apex at the other; the pericarp is thin, dry, blackish and wrinkled; thin sarcocarp beneath; endocarp consists of one white, curved, oily seed. The seed never fills the shell, and when long kept the shell is almost empty. Inodorous; bitter taste. Contains menispermia (*bitter taste*), paramenispermia (*tonic*), picrotoxin (*poison*), and picrotoxic acid.

Oval-Oblong, Shrivelled, Fleshy, Sweet, Acidulous.

PRUNUM. *P. domestica.* Prunes.

Numerous varieties, produced by cultivation, the fruits of which differ much in color, size and shape. The officinal variety is characterized by having oval-oblong fruit of a purplish-black color, and covered by a blue gloom when fresh. The endocarp is not smooth, the sarcocarp is the part used. Slight odor; sweet, mucilaginous taste. The variety of tree known as Juliana is said to furnish the above. Contains sugar, malic acid, and pectin.

4. LARGE BERRIES, SEVERAL OR MANY SEEDED.

Superior, Fleshy, Acidulous, Sweet.

UVA PASSA. *Vitis vinifera.* Raisins.

Climbing shrub. The fruit is exceedingly influenced by soil and climate; those which yield the raisins of commerce are confined to the basin of the Mediterranean. Large, fleshy, many-seeded berry, of a purplish-brown color, and of a sweet agreeable taste. Malaga raisins are considered the best. Corinthian raisins (currants) are small, bluish-black, fatty, of a vinous odor, and of a sweet, slightly acidulous taste. Contain principally grape sugar.

Superior, Blackish, Globular, Glandular, Ten-Celled.

AURANTIUM IMMATURA.—These are small, unripe oranges, about the size of a cherry; dried and rendered smooth by a turning lathe. They are blackish, globular, glandular and ten-celled, of a fragrant odor, and a bitter taste; used in discharges from issues; used also in the manufacture of ol. petit grain, by distillation.

Superior, Yellow, Globular, Glandular, Ten-Celled.

LIMONIS SUCCUS. *Citrus Limonum.* Lemon Juice.

Yellowish, oblong, apex prolonged to nipple shape; scar or remnants of pedicle at base; ten to twelve-celled, the cells filled with a juicy, acid pulp. The juice contains about eight per cent. of Citric acid ($H_3C_6H_5O_7$).

Superior, Grayish, Smooth, Pulp Mucilaginous.

BELA. *Ægle Marmelos.* Bael Fruit.

The dried, half ripe fruit is used; this is about the size of an orange, somewhat spherical, but flattened at the base, and depressed at the insertion of the stem; with a hard, smooth shell, from ten to fifteen-celled, containing the seeds and a large quantity of mucilage, which on drying becomes hard and transparent. It appears in vertical slices, or broken pieces, consisting of the rind with the brownish seeds and pulp adhering. No odor; astringent, mucilaginous taste. Contains Tannin, bitter principle and mucilage.

Superior, Green, Globular, Calyx at Base, Very Astringent.

DIOSPYROS. *D. Virginiana.* Persimmon.

The fruit is a globular berry, dark yellow when matured, and contains many seeds imbedded in a soft yellow pulp. The unripe fruit is used; this is green, adhering to a four-lobed calyx; of an astringent taste; after ripening, the astringent principle, tannin, is changed to sugar.

Superior, Red, Oblong, Calyx at Base, Taste Fiery.

CAPSICUM. Cayenne and African Pepper.

C. annuum, C. fastigiatum and other species.

Shrubby plants, two to three feet high; found in all tropical and sub-tropical countries. The fruits vary in size and shape. The fruit most general is a pendulous, pod-like berry, light, smooth and shining; of a bright red, or sometimes yellow color, oblong shape, pointed, recurved, and about the thickness of a finger; calyx at base; interior has two or three cells, which contain a dry, loose parenchyma, and numerous flat, reniform, whitish seeds. A variety is also used, which are very small, spherical, and slightly compressed. A variety imported from Liberia is very small, less than an inch in length, pointed, conical, and exceedingly pungent. Peculiar odor, strongest in the recent state and when in powder; fiery taste. Sawdust and red oxide of lead used to adulterate the powder; the former detected physically, the latter, by digesting the powder in ditute nitric acid, filtering, and adding a solution of sulphate of sodium, which will throw down a white precipitate if any oxide of lead is present. Contains about 2 per cent. *Capsicin,* gum and oleo-resin.

Inferior, Peeled, White, Spongy, Very Bitter.

COLOCYNTHIS. *Citrullus Colocynthis.* Bitter Apple.

Annual plant, resembling the watermellon in its growth, sometimes rising on walls, &c. The fruit is globular, about the size of a small orange. Yellow and smooth when ripe, and contains, beneath a hard, leathery rind, a white spongy, pithy matter, in which numerous ovate, compressed, grayish seeds are imbedded. They are deprived of the pericarp before being sent into commerce, and thus have the appearance of whitish, light, spongy balls; they abound in the seeds (about three-fourths of their weight); these are rejected. No odor; very bitter taste. Contains *Colocynthin,* a glucoside. Converted into *Colocynthithin* by dilute acids.

5. CAPSULES, SUPERIOR.

Long, Terete, Blackish, Transverse Cells, One-Seeded.

CASSIA FISTULA. *C. Fistula.* Purging Cassia.

Large tree; flowers in an indehescent cyme. The pods are long (a foot or more), terete, straight or but slightly curved, less than an inch in diameter, with a woody shell; externally of a dark-brown color, and marked with three longitudinal shining bands, extending from one end to the other, two of which are very close, appearing as one, and the third situated on the opposite side. These bands mark the junction of the valves of the capsule, and are occasionally hollowed in the form of furrows. There are also circular depressions at unequal distances. Internally divided into numerous transverse cells, which are covered with a soft, black pulp; each cell contains a single, oval, shining seed. The pulp only is employed; this is of a rather disagreeable odor and of a sweet mucilaginous taste. Contains sugar, gum, tannin and oxalate of calcium.

Flat, Broad, Linear, Brown, Transverse Cells, One-Seeded.

CERATONIA. St. John's Bread.

Follicles Eight, Stellate, One-Seeded.

FRUCTUS ANISI STELLATI. *Illicium Anisatum.* Star Aniseed.

Evergreen tree, growing in China, Japan and Tartary. The fruit consists of about eight follicles, which are brownish, ligneous and about half an inch in length; these are united together in a stellate manner, each containing one brown, shining seed. Aromatic odor; warm, aromatic taste. This species furnishes nearly all of the Oil of Anise of comerce, of which it yields about, 2.25 per cent.

Sub-Globular, Stigmas Sessile and Stellate.

PAPAVER. *P. somniferum.* Poppy.

Several varieties comprise this species, but only two are of permanent distinction; these are known as the white and black poppy, owing to the color of their seeds; the former is usually conjectured to be the true opium plant. Both are annual, about three feet high, with a round, erect, smooth, sometimes branching stem, covered with a bloom. The flowers are very large, terminal, and of a whitish color. The capsule is smooth, and covered with the bloom; of various shapes, long, round, but generally sub-globular, (the long are said to be the richest in morphia); somewhat flattened at both extremities; from two to four inches in diameter; crowned with the persistent stigmas, which are stellate and arranged in a circle upon the summit. It contains numerous, very small, light colored seeds, which in the fresh state adhere to the partitions, but when dry, separate; and when perfectly ripe, escape through small pores beneath the stigmas. In the black poppy, the flower is usually of violet or red hue, the capsule somewhat smaller and more globular, and the seeds of a brownish color. The nearly ripe capsules are directed, and as found in commerce, both are of a yellowish color, of a papery consistence, no odor, and with little taste, unless long chewed, when they are bitter. Principle and properties analagous to opium, but are exceedingly feeble. The seeds yield about fifty per cent. of a mild, bland, fixed oil, much used in the arts.

Utricle, Greenish, Small, Seeds Black.

CHENOPODIUM. *C. anthelminticum.* Wormseed.

Shrub, about four feet high, with an erect, branching, furrowed stem. The fruit is small, thin-walled, and one-seeded, and known botanically as a utricle; this is of a greenish color, not larger than a pin's head, irregularly globular, very light, containing one very minute, lenticular, black seed. Peculiar offensive odor; bitterish, pungent taste. C. ambrosioides is distinguished by its odor, which is weaker and less offensive. Contains one-half to two per cent. vol. oil.

6. CAPSULES, INFERIOR.

Triangular-Ovate; Seeds Angular, Brown.

CARDAMOMUM. *Elettaria Cardamomum.* Cardamom.

Perennial plant, about ten feet high, with a tuberous rhizome, sending up numerous erect, simple, smooth, green stems. The peduncle issues from the base of the stem, and is recumbent. It begins to yield its fruit at the end of the fourth year, and continues to bear several years. The capsules are gathered at maturity, dried, and separated from the petioles and calyx. They are triangular-ovate, from a half to one and a half inches in length, from a-sixth to half an inch thick, obtusely pointed at both ends, with flat and ribbed sides, three-celled, three-valved, and of a yellowish color. The seeds which they contain are small, numerous, arillate, angular, irregular, rough, as if embossed upon their surface, of a brown color; easily powdered, and thus separated from their coriaceous pericarps (the pericarpal coats should be rejected when required for use). The seeds constitute about seventy-four per cent. by weight. Fragrant odor; warm, aromatic, slightly pungent taste. The "lesser cardamom" of most writers is the variety recognized by the Pharmacopœias and generally found in commerce. They have been known to be adulterated with orange seeds and unroasted grains of coffee. Contains 4.5 per cent of volatile oil; also fixed oil.

Long, Linear; Pulp Aromatic; Seeds, ∞, Small.

VANILLA. *V. aromatica.* Vanilla.

Climbing plant, characterized as a species by its ovate-oblong, nerved leaves, its spreading sepals, its acute lip, and long, cylindrical capsules. Begins to bear in three years, and continues for thirty or more. The capsules are collected before they are quite ripe, dried in the shade, covered with a coating of fixed oil, and then secured in bundles, which are wrapped in sheet lead, or enclosed in small metallic boxes. Several varieties are known in trade; the most valuable known as *ley*, are cylindrical, somewhat flattened, about seven inches long, half an inch thick, nearly straight, narrowing towards both ends, bent at the base; the pericarp is wrinkled longitudinally, of a shining dark brown color, soft and flexible; the endocarp consists of a soft, black, oily, aromatic pulp, in which numerous minute, black, round, glossy seeds are embedded; these seeds are without a loose coating. It has a peculiar, strong, aromatic odor, and a warm, aromatic, sweetish taste, the pulpy portion is the most aromatic. Another variety, called *simarona*, is smaller, lighter in color, and less aromatic; a third variety (*pompona*), the pods of which are slightly smaller than the former, considerably broader, generally open, brown, soft, viscid, of a strong odor, but of a less pleasant aroma. The aroma of vanilla depends on the chemical changes which take place during and after curing. The frost-like efflorescence on the outer surface is said to be *vanillic* acid.

7. CREMOCARPS.

(UMBELLIFEROUS FRUITS.)

FRUIT.—Cremocarps, composed of two mericarps. Commissure (face, line of junction) adheres to carpophore (central axis, stalk) back parallel to side ends of commissure. Costæ or Jugæ (ribs), five primary, four secondary, valleculæ (groove), vittæ (oil tubes), embryo.

SUB-ORDERS.		OFFICINAL.
Cœlospermæ,	Face concave.	Coriandrum.
Campylospermæ,	Face grooved lengthwise.	Conium.
Orthospermæ,	Face flat, or nearly so.	Anisum.

(A.) Face Concave: CŒLOSPERMÆ.

Globular; Ribs Eighteen, Linear, Wavy; Vittæ, Four.

CORIANDRUM. *C. sativum.* Coriander.

Annual plant, about two feet high, with an erect, round, branching stem. The plant, when fresh, has a bed-bug odor, and the vol. oil, distilled with anhydrous H_3PO_4, yields an oil of the same disagreeable odor. The fruit is almost globular, composed of two concave, hemispherical mericarps, closely united by the pericarp; about the eighth of an inch in diameter; slightly pointed at apex (style), scar at base (pedicle); pale brownish color. The pericarp is of a woody nature, and breaks with difficulty; the interior is entirely hollow, lenticular shape; the five primary ribs are merely indicated by wavy, linear lines; the secondary ribs are more prominent and are situated on the edge of the faces of the four oil cells. The fruit becomes of a fragrant odor by drying; aromatic taste; 5 per cent. vol. oil; thin, yellow; 13 per cent. of fat.

(B.) Face Grooved Lengthwise: CAMPYLOSPERMÆ.

Ovate, Laterally Compressed, Smooth; Ribs Crenate; Vittæ, None.

CONII FRUCTUS. *Conium maculatum.* Conium Seed.

These are roundish-ovate, an eighth of an inch in length by a tenth of an inch broad, striated; and composed of two plano-convex, easily separated mericarps; laterally compressed, rather contracted near the base, the thick stylopodium at apex, giving the round appearance. Gray, smooth, each mericarp has five ribs; these are crenate (jagged) and of a lighter color; vittæ absent. Feeble odor, bitterish taste. Collected in the green state just before ripening. About ten times as strong as the leaves. Contains .0001 per cent. of a vol. alkaloid, *Conia*, a yellowish, oily liquid; odor of urine of mice.

(C.) Face Flat or Nearly So: ORTHOSPERMÆ.

Ovate, Laterally Compressed.	*Hairy, Vittæ, About Thirty.*	*Anisum.*
	Smooth, Very Small, Vittæ, Twenty-Four.	*Apium.*
	Smooth, Small, Vittæ, Twelve.	*Petroselinum.*

ANISUM. *Pimpinella Anisum.* Aniseed.

Annual, a foot high, with an erect, smooth, branching stem. Two or three varieties have been produced by cultivation; these are distinguished from each other by the relative size of their fruits; the variety known as Spanish is the smallest, and is usually preferred. The fruit in general appearance, resembles Conium; they are about a fifth of an inch in diameter, about a line in length, ovate, laterally compressed, attached to their footstalks, brownish-gray. They are distinguished from Conium, by being usually larger, in the whole state; each mericarp having five distinct ribs; these ribs lighter in color, more or less hairy and not jagged; the cross section shows a large number of vittæ (fifteen to thirty) of various sizes; also by their fragrant odor and sweet, aromatic taste. Contains 2 per cent of vol. oil, which consists of two portions. Anethol.

APIUM. *A. graveolens.* Celery.

Celery is minute, less than a twentieth of an inch in diameter, ovate, laterally compressed, smooth; resembles anise; twelve to fifteen oil tubes, and five ribs to each mericarp. Aromatic odor; warm, sweet taste.

SEMEN PETROSELINUM. *P. sativum.* Parsley Seed.

Half fruits, small, ovate, flat on one side, convex on the other; smooth, about a line in diameter, dark green; each mericarp has five, narrow, equal, longitudinal ribs, and six oil tubes. Terebinthinate odor; warm, aromatic taste.

Oblong, Terete, Smooth, Vittæ Six.	*Ribs Prominent, Obtuse.*	*Fœniculum.*
	Ribs Thin, Obtuse.	*Phellandria.*

FŒNICULUM. *F. dulce.* Fennel.

Extensively distributed over the world. Varies considerably in the length of the fruit; the longest attains the length of half an inch. Oblong, terete, sometimes curved; the cremocarp is scarcely flattened; transverse section nearly circular, dark brown, smooth; the five primary ribs are light brown, prominent and obtuse; the lateral are on the edge, and rather broadest; one oil tube in each depression, two on the commissure. Usually appear as half fruits, but are not unfrequently connected by their flat surface. There are said to be two varieties; one of them about two lines in length, dark brown, rather flattened, usually in half fruits, and without footstalks; the other about half an inch long, light brown, ribs more prominent, often in the whole state, and frequently furnished with footstalks. Both are of a fragrant odor, and of a warm, sweet, aromatic taste. Contains three per cent. vol. oil chemically identical with oil of anise. Anethol.

PHELLANDRIA. Water Hemlock.

From a line to a line and a half in length, oblong, terete, narrow above, compressed somewhat, smooth, marked with ten thin, obtuse ribs, and crowned with the stylopodium; six oil tubes; yellowish-brown color; strong, disagreeable odor; acrid, aromatic taste.

Oblong, Laterally Compressed, Vittæ Six.	*Ribs Eighteen, Rough.*	*Cumin.*
	Ribs Ten, Smooth.	*Carum.*

CARUM. *C. Carui.* Caraway.

Biennial plant, about two feet high, with an erect, branching stem. The flowers appear in June, and the fruit, which does not mature till the second year, ripens in August; the fruit growing in the northern part of Europe is the most highly valued. It generally occurs in mericarps; these are about two lines in length, oblong, laterally compressed, slightly curved, and of a dark brown color; five longitudinal ribs to each mericarp; these are smooth, and of a lighter color; six large oil tubes, easily observed. Aromatic odor; warm, spicy taste. Contains four to six per cent. vol. oil. Consists of two portions *carvene* and *carvole.*

CUMIN. *Cuminum Cyminum.* Cumin Seed.

This resembles Carui, but is distinguished by the odor, which is entirely different and also by its occuring in the whole state, not in halves, as Carui. Oblong, laterally compressed; vittæ six; eighteen smooth ribs. Contains vol. oil—*hyduret of cumyl.*

Oval-Oblong, Dorsally Compressed, Vittæ Six.	*Ribs Ten, Smooth.*	*Anethum.*
	Ribs Eighteen, Bristly.	*Carota.*

ANETHUM. *A. graveolens.* Dill Seed.

Annual, about four feet high, with an erect, striated, branching stem. The fruit is about two lines in length, and less than one line broad, of an oval-oblong shape, thin, concave on one side, convex and striated on the other, dorsally compressed, of a brown color, and surrounded by a yellowish membranous expansion; this is due to the lateral ribs being developed into wings; ten smooth ribs; generally appears in half fruits. Peculiar aromatic odor; warm, pungent taste. Contains one to two per cent of vol. oil.

CAROTA. *Daucus Carota.* Carrot Seed.

Extensively distributed; when collected for medicinal purposes, they are taken from wild plants. The fruit consists of two plano-convex bristly mericarps, connected by the commissure; very light, oval-oblong in appearance, dorsally compressed, and of a brownish color; six oil tubes; eighteen thin ribs, the primary being scarcely prominent, while the secondary are beset with long bristles. Aromatic odor; warm, slightly bitter taste. Contains minute portion of vol. oil.

8. PERICARPS.

Leathery, Glandular, Orange or Greenish.

AURANTII AMARI CORTEX. Bitter Orange Peel.
Citrus vulgaris.

AURANTII DULCIS CORTEX. Sweet Orange Peel.
Citrus Aurantium.

The structure of all the pericarps of the Aurantiaceæ are similar. This consists of a thin, orange or greenish colored exterior layer, of a coriaceous consistence, abounding in vesicles filled with essential oil, and of an interior portion, which is very white, thick, insipid and spongy. The "Seville orange" furnishes the "Amari;" the rind of this is thinner and more delicate than the "Dulcis." The first is used as a tonic; the latter simply as an agreeable flavor. Grateful, aromatic odor; warm, bitter taste; this is much more manifest in the Seville. Contains vol. oil and Hesperidin.

Leathery, Grandular, Yellow.

LIMONIS CORTEX. *Citrus Limonum.* Lemon Peel.

The structure of this is identical with the above, differing only in the exterior portion being of a yellow color, and the taste less agreeable. Contains vol. oil and Hesperidin.

Hard, Brown, with Tubular Calyx.

GRANATI FRUCTUS CORTEX. Pomegranate Rind.
Punica Granatum.

The fruit is a globular berry, about the size of an orange, crowned with the tubular calyx, covered with a reddish-yellow, thick, leathery rind, and divided internally into numerous cells; these are arranged in two stories, fifteen to twenty in the upper, eight to nine in the lower, which contain a bright red acidulous pulp, and numerous oblong, angular seeds. The rind is found in commerce in the form of irregular pieces, hard, dry, brittle, of a brown color externally, paler within, without odor, and of an astringent taste. Contains twenty-eight per cent. tannin, sugar and resin.

9. PRESERVED FRUIT.

Acidulous, Red Brown, with Brown, Glossy Seeds.

TAMARINDUS. *T. Indica.* Tamarind.

Large tree, the only species of this genus. The fruit is a broad, compressed, red-brown pod, much curved, from two to six inches long, with numerous brown, flat, quadrangular, glossy seeds, contained in cells formed by a tough membrane. On the outside of this membrane is a light colored, acidulous, pulpy matter, between which and the shell are several tough, ligneous strings, running from the stem to the end of the pod, the attachment of which they help to strengthen. The shells are fragile and easily separated. They are preserved by placing the pods, previously deprived of their shells, in layers in a cask, and pouring boiling syrup over them; or by placing them in stone jars, with alternate layers of powdered sugar. They are then of a dark colored adhesive mass, consisting of syrup mixed with the pulp, membrane, &c., of the pod, and of a sweet acidulous taste. Should not have a musty smell. Copper, if present, may be detected by immersing in them a clean piece of steel, which will become coated with red matter. Contains sugar, citric, malic and tartaric acids, also pectin.

SEEDS.

1. OF DICOTYLEDONOUS WITHOUT ALBUMEN.

A. EMBRYO STRAIGHT.

Angular, Ovate; Testa, Mucilaginous.

CYDONIUM. *Cydonia vulgaris.* Quince Seed.

Shrub or small tree; the fruit is similar in shape to the pear, same tissues and same sub-order. In each of its several cells there are a large number of seeds inclosed (twenty or more); these adhere to each other, somewhat pressed. They are angular, ovate, from an eighth to three-eights of an inch in length, always more or less irregularly pressed. Externally the testa is brown, but the epithelium is colorless and transparent, and contains the thick layer of mucilage, and this is the portion which swells. Internally the white embryo fills the seed completely. Inodorous; nearly insipid. No albumen is contained in seeds of N. O. Rosaceæ. Contain twenty-five per cent. of gum and uncrystallizable sugar.

Flattish, Ovate; Testa, Scurfy, Brown.

AMYGDALA AMARA. Bitter Almond.
Amygdalus communis var. amara.
AMYGDALA DULCIS. Sweet Almond.
Amygdalus communis var. dulcis.

Small tree. The original is thought to be the one with the bitter kernel, and the sweet to be produced by cultivation. The fruit is a drupe, the peri. and sarcocarp leathery, and the endocarp (strong part) hard, and marked with a longitudinal furrow. The bitter and sweet varieties are only distinguished by their constitution, though the bitter are usually smaller, and of a more bitter taste. Flattish, ovate; the scaly, brown coat is the testa, the inner coat the tegmen; in the pointed portion lies the radical (two cotyledons) with a small plumule at apex of radical; the mealy portion outside consists of shell. Deprived of the testa, they are called blanched almonds. Bitter almonds contain a somewhat lower proportion of fixed oil than the sweet. *Amygdalin* contained in the bitter almond, when acted upon by the peculiar ferment, yields *oil of bitter almond* and *hydrocyanic acid.*

Flat, Ovate; Testa, White Margin.

PEPO. *Cucurbita Pepo.* Pumpkin Seeds.

These are oval, extended to a blunt point at one end, flat, but somewhat swollen in the middle; the testa is whitish. Characterized by having a thin, brittle testa, and a broad margin running parallel with the edge; about three quarters of an inch in length by half an inch broad. The interior is white and oily; sweet taste. This and the two following are anatropous, contain fixed oil, and are used as tœnifuges.

Flat, Ovate; Testa, Marbled or Orange. Citrullus.
Flat, Lance-Oblong; Testa, White. Melo.

Demulcent. Diuretic. Fixed Oil.

Oblong, Aromatic; Testa, Blackish, Wrinkled.

DIPTERIX. • *D. odorata.* Tonqua Bean.

Large tree. Fruit, oblong-ovate pod, enclosing a single seed. D. odorata. Dutch portion of Guiana. One half to two inches long. D. oppositifolia. English portion of Guiana. Rarely an inch long. The Dutch is the most highly valued. Both are narrow, oblong, one end broader. This end contains the thick, broad radical and plumule; the yellowish, oily cotyledons fill the entire shell; from a quarter to half an inch broad; the testa is blackish, shining, thin and wrinkled. Strong, aromatic odor; aromatic, bitter taste. The Dutch var. is frequently covered with a large number of crystals (*coumarin*), which are never seen on the English var.

Ovate-Oblong, Cotyledons Brown, Irregularly Folded.

THEOBROMA. *T. Cacao.* Chocolate Nuts.

Small tree. The fruit is an oblong-ovate berry, about seven inches long, with a thick, coriaceous, blackish rind, enclosing a large number of seeds embedded in a buttery pulp, and arranged in two rows. These differ in color; general shape, ovate-oblong, slightly flattened and compressed, about the size of an almond; the testa is thin; the radical is situated on the broader side; the cotyledons brown, oily, irregularly folded, and easily broken. Agreeable odor when bruised; bitterish, oily taste. Contains 45 to 53 per cent. of fixed oil (*butter of cacao*); 1.5 per cent. of an alkaloid (*theobromina*).

B. EMBRYO CURVED.

Sub-reniform, Oblong, One Edge Furrowed.

PHYSOSTIGMA. *P. venenosum.* Calabar Bean.

Introduced into medicine about twelve years ago. Climbing plant, with a ligneous stem. The fruit is a legume, about seven inches long, and contains two or three seeds, separated by a woolly substance. The seeds are about an inch in length by three-fourths of an inch in breadth, with a very firm, hard, brittle, shining testa of a brownish-red color. Of a peculiar shape, slightly reniform and flattened, with a longer convex and a shorter concave edge; on the arch portion there is a deep furrow, running the entire length of its convex margin, and ending in an aperture (hilum) near one of the extremities of the seed. Within the testa, the radical is situated at one end of the furrow, and is bent in the same direction as the edge of the seed; the cotyledons enclose a cavity; the two cotyledons weigh on an average forty-six grains, and are hard, white, and pulverizable, of a taste like that of ordinary edible leguminous seeds, without bitterness, acrimony, or aromatic flavor. The cotyledons constitute seventy per cent., the testa thirty per cent. of the seed. Contains *escrina*—said to be identical with *physostigmia*. Contracts the pupil powerfully.

Angular, Yellowish, Hard, Mucilaginous.

SEMEN FŒNI-GRŒCI. *Trigonella Fœnum-græcum.* Fenugreek.

Annual plant. The fruit is in long capsules containing a large number of seeds. These are of a quadrangular shape, somewhat compressed, furrowed on both sides, extending almost the entire width; this is plainly visible when soaked, the radical is contained in the furrow; about two lines long, brownish-yellow testa, yellowish cotyledons; of an odor resembling tonka, and of a bitterish, mucilaginous taste. Contain mucilage and oil.

Globular, Cotyledons Folded; Testa, Pitted, Yellowish

SINAPIS ALBA. *S. alba.* White Mustard.

Globular, Cotyledons Folded; Testa, Pitted, Dark Brown.

SINAPIS NIGRA. *S. nigra.* Black Mustard.

The chief difference in these are the pods; the pod of S. alba has a long beak, and in that beak there still remains one seed, while the pod of S. nigra has a shorter beak, and this beak is destitute of seed, and the seed are smaller, darker in color, and with larger pits than the former. Both are small and globular; the testa is more or less pitted, these pits being easily observed with a magnifying glass; internally the yellow embryo and cotyledons are folded, bent along the midrib. Inodorous in the entire state; distinct, pungent odor when in powder, or when rubbed with water or vinegar, and of a hot, pungent taste. The testa of S. alba is colorless and transparent, the embryo bright yellow. Both yield a fixed oil, which on saponification liberates *erucic acid.* By distilling black mustard with water about 5 per cent. vol. oil is obtained (*sulphocyanide of allyl*). White mustard yields *Sinalbin.*

Globular, Cotyledons Folded; Testa, Brown-Black. Rapa.
Globular, Cotyledons Folded; Testa, Blue-Black. Brassica napus.

Both of these have precisely the same structure as the above.

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2. DICOTYLEDONOUS WITH ALBUMEN.

A. EMBRYO STRAIGHT.

Orbicular, Gray, Silky, Albumen Horny, with Internal Cavity.

NUX VOMICA. *Strychnos Nux vomica.* Nux Vomica.

Tree of moderate size, with a smooth, dark gray bark, (False angustura,) and shining leaves. All parts of the plant are poisonous. The fruit is a somewhat oblong berry, about as large as an orange, with a smooth, yellow, ligneous pericarp, one-celled, and contains from two to eight seed, vertically placed in the fruit, and embedded in the juicy pulp. The seeds are circular discs, about an inch in diameter and two lines in thickness, flat, or slightly convex on one side, and concave on the other; the margin is even, or raised so that the external central portion is depressed. Outside of the testa there is a projection, running an elevated line to centre, (raphe;) one end is the chalaza, the other the hilum. Of a gray-green, shining, silky appearance, due to a large number of fine, silky, yellowish-gray hairs, closely pressed to the seeds, and forming a tuft around the edge; after removing the hairs, we have the thin, fragile, somewhat soft testa, which closely invests the albumen. This is of the same circular shape as the seed, hard, horny, semi-transparent or opaque, consists of two discs just at the edge, and in thin layers, leaving a flat cavity in the centre which contains the embryo on one side. The embryo consists of a short radical, and two flat, heart-shaped cotyledons, each longitudinally nerved, and extending one fourth the distance of the cavity; the plumule is situated at the forks of the cotyledons. Inodorous; extremely bitter taste. The seeds of all the species of S. are not poisonous, S. potatorum used to clarify water. Contain *strychnia*, *brucia*, and *igasuria* combined with *igasuric acid*. (*See Table of Alkaloids.*)

Angular, Oblong, Brown; Albumen Horny, with Internal Cavity.

IGNATIA. *Strychnos Ignatia.* St. Ignatius Bean·

Climbing shrub. Globular, somewhat oblong fruit, about the size and shape of a pear, with a smooth, whitish, ligneous pericarp, enclosing ten to fifteen seed, embedded in a dry medullary matter and lying one upon the other. Name received from the Jesuits. The shape of the seeds is much modified, owing to the manner they are placed in the fruit; about an inch long, less in breadth, more so in thickness; they appear in various forms; the general shape is ovate, flat and always more or less obscurely angular, and marked at one end with a small depression indicating their point of attachment (hilum.) The testa is of a less silky nature than Nux V. and of a gray-brown color; in commerce they appear perfectly smooth; this is due to the testa and hair being removed by the seeds rubbing against one another, and therefore the seeds as they appear in market consist only of albumen. This is hard, horny, brown, and when fresh translucent; the embryo is contained in the broader end, the internal cavity is not regular; the *cotyledons* extend one half the distance of the cavity. Inodorous;

excessively bitter taste. The same identical composition as in S. Nux Vomica, qualitatively, not quantitatively.

Tetrahedral, Flattish, Black, Small.

DELPHINUM. *D. Consolida.* Larkspur.

Tetrahedral, Flattish, Gray, Large.

D. Staphisagria.. Stavesacre.

Both are small annual plants, with small follicles containing a few small seeds. These seeds are about as large as a grain of wheat, irregularly triangular; wrinkled, compressed, surface pitted; white, oily albumen; small embryo. D. Consolida is directed by the U. S. P., but D. Staphisagaria is the variety usually found in commerce; the sole difference exists in the latter being slightly longer and lighter in color. Slight odor; nauseous, bitter taste. Principal constituent *delphinia*, a crystallizable alkaloid, soluble in alcohol, chloroform and benzol.

Flat, Ovate-Oblong, Glossy, Brown; Albumen, Thin.

LINUM. *L. usitatissimum.* Flaxseed.

Small plant. The fruit is a globular capsule, about the size of a pea, calyx at base, sharp spine at apex, and with ten cells, each cell containing a solitary seed. The seeds are ovate-oblong, flattened on both sides with acute edges, somewhat pointed at one end, about a line in length. Externally the testa is covered with a thin epithelium; this is colorless and transparent, contains the mucilage, and when thrown in water can be seen to swell; the testa is smooth, glossy, and varies in color from brown to white; the tegmen is thin. Internally the albumen is thin, and not easily recognized; oily and yellowish-white embryo. Inodorous; oily, mucilaginous taste. Ripens in August. The constituent of chief importance is the fixed oil, which the seed contains to about one third of its weight; 20 to 30 per cent., however, is only yielded by pressure on a large scale.

Globular, Ovate, Aromatic, Oily; Albumen, Marbled.

MYRISTICA. *M. fragrans.* Nutmeg.

Tree of medium size, resembling the orange tree, not flourishing well outside of the Molucca islands. The fruit is a round or oval drupe, size of a small peach, smooth, at first pale green, then yellow when mature, and marked with a longitudinal furrow; this pericarpal coat, which is at first thick and fleshy, and abounding in astringent juice, afterwards becomes dry and leathery, and separates into two valves from the apex, disclosing an orange-colored, lobed arillus (*mace*), closely investing a thin, brown, shining shell, which contains the kernel or nutmeg. Gathered as soon as the fruit begins to split, mace detached, the seed dried, kernel extracted and treated with lime. These kernels are of a roundish or oval shape, obtuse at each end, marked with worm-shaped furrows, of a greenish color, hard, smooth to the touch, easily cut or grated, but not easily powdered. When opened the kernel presents a yellowish albumen, varied with reddish-brown, branching, irregular veins, which give to it a marbled appearance; these dark veins contain the oily matter. Fragrant odor; warm, aromatic taste. They should be rejected when very light, of a feeble taste and smell, worm eaten, musty, or marked with black veins. The male, wild, or long nutmeg, as it is variously termed, is occasionally found in market; this is much longer than the above, elliptical, destitute of the dark brown veins, of a bitter odor, and disagreeable taste. The principal constituent is the fat which makes up about one fourth of its weight. The vol. oil amounts to between two and three per cent.

Ovate-Oblong; Testa Glossy, Marbled, Gray or Red-Brown.

RICINUS. *R. communis.* Castor Oil Seed.

Shrub. The fruit is a roundish glaucous capsule, with three projecting sides, covered with tough spines, and divided into three cells, each containing one seed, which is expelled by the dehiscence of the capsules. Ripens in August. The seeds are about the size of a bean, ovate-oblong, somewhat compressed, obtuse at the ends; the testa is covered with a very thin pellicle upon which depends the variegated, marbled color; smooth and shining. At one end of the seed is a small yellowish excrescence, from which an obscure longitudinal ridge proceeds to the opposite end, dividing the side upon which it is situated into two flattish surfaces. The testa itself is hard, brittle, blackish, tasteless and easily separated; very oily, white albumen and embryo. Inodorous; taste sweet, then slightly acrid. Receives its generic title from its resemblance to the "tick." Seventy per cent. kernel, thirty per cent. shell. The testa is inert. The seeds are more active (weight for weight) than the oil. The peeled kernels yield at most half of their weight of castor oil.

Ovate-Oblong; Testa Dull, Marbled Black and Red-Brown.

TIGLIUM. *Croton Tiglium.* Croton Seed.

Small tree. The fruit is a small, smooth capsule, three-celled, three-seeded. The seeds are a little larger than those of Ricinus, oval-oblong, rounded at the ends, with two faces, the external considerably more convex than the internal; these faces are separated from each other by longitudinal ridges, thus giving the seed an irregular quadrangular appearance. Occasionally (as in coffee) their internal surface is flat with a longitudinal groove; this is owing to the presence of only two seeds in the capsule, the groove being produced by the central axis. The testa is soft, dull, yellowish-brown; the tegmen black and smooth; and as the testa is usually partially removed by friction, the seeds as they appear in market are generally marbled, and sometimes nearly black. The albumen and embryo are yellowish-brown and oily. Faint odor; acrid taste; sixty-four per cent. embryo, thirty-six per cent. testa. The principal constituent of the seed is the fatty oil—*oleum tiglii*—of which the kernel affords from fifty to sixty per cent.

B. EMBRYO CURVED.

Plano-Convex; Albumen Horny, Deeply Grooved.

CAFFEA. *Coffea Arabica.* Coffee.

The fruit is a roundish drupe, umbillicate at top, at first green and finally dark purple, about the size of a cherry, with a thin endocarp, and the shell connected with the integuments of the seed; contains two seeds, and these, divested of their integuments, constitute coffee; thus, as they appear in commerce, consisting wholly of albumen. The general shape is plano-convex, the flat side marked with a longitudinal furrow; of a horny consistence; the small embryo is situated at one end; of a pale brownish-green color, faint, peculiar odor (stronger by age), and with a slightly sweetish, somewhat astringent taste. The largest are obtained from Java and the W. I.; medium from So. Am.; small from Liberia. Should be hard, and sink readily in water; to be rejected when soft, light, black or dark colored, or musty. Undergoes considerable change during the roasting process; swells very much, acquiring almost double its original volume, while it gives off from fifteen to eighteen per cent. of vapor, and a small quantity of *caffeina* is volatilized, at the same time acquiring a peculiar odor and a bitter taste.

Reniform and Pitted; Small, White and Blue-Black.

PAPAVER. *P. somniferum.* Poppy Seed.

The white and blue-black varieties differ only in being obtained from the two capsules of the same respective names. Both are small, reniform, pitted, with large albumen; embryo curved in a semi-circular manner; hilum near the sinus.

The mild, bland, fixed oil which they contain to the extent of fifty per cent. is used in Europe as a substitute for Ol. Olivæ.

Reniform and Pitted; Small, Brown-Gray.

HYOSCYAMI SEMEN. *Hyoscyamus niger.* Henbane Seed.

Produces long, bottle-shaped, two-celled capsules, enclosed in the calyx; opens circumscidially, and contains a large number of seeds. These are small, reniform, of a peculiar gray-brown color, slightly wrinkled, much pitted, and near the raised portion of the testa are rather sharp (distinction from Stramonium). The entire seed is filled with a white, oily albumen; the embryo is curved in a peculiar manner, so as to form the figure 9, a half of which belongs to the radical, the whole being nearly cylindrical. When dry no odor is apparent, but when rubbed, distinct narcotic; bitter, oily taste. Contains fixed oil and *hyoscyamia*, a volatile alkaloid.

Reniform and Pitted; Larger, Black.

STRAMONI SEMEN. *Datura Stramonium.* Stramonium Seed.

Spiny, roundish-ovate capsules, four-celled, imperfectly divided; true number of cells two, but is distended to four; from 700 to 735 seeds in each capsule; 9½ of these equal one grain. The seeds are about one-eighth of an inch in length, roundish-reniform, somewhat flat, and of a lighter color near the straight hilum: externally, black and dull, the surface very closely pitted, and the testa between the pits round and broad; internally, white or green, mostly albumen, embryo curved.

Inodorous in the whole state, peculiar when crushed; and of a nauseous, slightly acrid taste. Fixed oil and *daturia*.

3. MONOCOTYLEDONOUS. ALL ALBUMEN.

Linear, Oblong; Black-Brown, Acrid.

SABADILLA. *Veratrum Sabadilla.* Cevadilla.

Occurs in commerce mixed with the fruit; this consists of three thin, papery, acuminate follicles, united by their base, nearly erect, which open by ventral suture (similar to star anise and delphinium) and appear like a single follicle with three cells. It is three or four lines long and a line and a half in thickness, obtuse at the base, light-brown or yellowish and smooth. Each follicle contains from two to six seeds; these are two to three lines long, narrow, linear, flat on one side and convex on the other, somewhat curved, surface somewhat glossy, apex pointed and thin, compressed, (packed in the follicles), shrivelled longitudinally, slightly winged; black or dark-brown on the outside, hilum at broad portion; discolored, oily albumen internally. Scarcely any odor; oily, bitter, strongly acrid taste. The powder is powerfully sternutatory.

Obtained the name of Cevadilla, from the Spanish for barley; supposed to resemble. Contains *veratria* and *sabadillia;* the former soluble in alcohol, ether or chloroform: the latter insoluble in ether.

Sub-globular, Granular; Brown, Bitter.

COLCHICI SEMEN. *C. autumnale.* Colchicum Seed.

Flowers late in autumn; the fruit appears the coming summer; collected in August. It is a triangular, inflated capsule, containing a large number of seeds. These are nearly globular, about one-eighth of an inch in diameter, brown and somewhat scurfy externally; a slight projection on one side in the immediate neighborhood of the hilum (lateral growth); thin testa, and when broken adheres closely to the white albumen, which fills the entire seed, and is characterized by its extreme hardness; short radical. No odor in the whole state; slight, peculiar odor when crushed; oily, bitter taste.

The active principle *colchicia* is said to amount to 0.05 per cent.

CELLULAR DRUGS NOT EASILY RECOGNIZED AS PARTS OF PLANTS.

Sub-Globose.

GALLA. *Quercus infectoria.* Galls.

Excrescences caused by punctures and deposition of ova of an insect—genus, Cynips. Hard, heavy, round bodies; smooth, having short fracture. The puncture causes the juices to flow to the spot and the abnormal growth results. Galls is a general name for such excrescences; some obtain great magnitude, but the officinal is obtained from Quercus Lusitanica, var. infectoria. When the deposited larva has developed into a winged insect it bores its way out from the centre and escapes, but sometimes galls are gathered while the insect is still in the larval state, which gives rise to two varieties. *Blue or green;* not perforated, comparatively heavy; the best. *White;* perforated, yellowish-brown hue; lighter in weight. The color of the interior varies from a pale brown to a deep greenish-yellow; the central cavity is lined with a thin, hard shell. If the insect, however, perished without escaping, the central cavity contains a mass of loose, starchy, cellular tissue, or its pulverulent remains. If the insect has not been developed at all the centre of the gall is composed entirely of this tissue; interior part contains the tannin. This principle is the anhydride of gallic acid, by water converted into the latter acid.

Linear, Oblong, Furrowed.

ERGOTA. Spurred Rye.

Sclerotium of Claviceps purpurea replacing the grain of Secale cereale.

Ergot (French; *Ergot, a cock's spur.*) A curious fungus—the compact mycelium—growing frequently in the head of rye, though found in all grasses and some sedges. The old opinion was that it was diseased seed, but microscopy has revealed that it has nothing at all in common with the rye, but growing originally from the ovary, it naturally assumes something of the shape of the mould in which it grows. It has been advanced as an opinion that spores of this fungus plant are taken up by the roots of the rye and they germinate in the ovary, where they are deposited from the sap. As found in commerce it consists of fusiform grains from one-third to one and a half inches long, one-half to four lines in diameter. Sub-cylindrical or obtusely prismatic; tapering toward the ends; generally arched with a longitudinal furrow on each side. At the apex of each grain there is often a small, whitish, easily detached appendage, while the opposite extremity is somewhat rounded. They are firm, horny, somewhat elastic, brittle when dry, yet difficult to pulverize; transverse fissures often lay bare the whitish interior; offensive odor; rancid taste. Contains oil; no starch; iodine test does not betray any of the latter. Also *ecbolina* and *ergotina*, combined with *ergotic acid;* and *mycose.*

Cylindrical, Mucilaginous.

SASSAFRAS MEDULLA. *S. officinalis.* Sassafras Pith.

Thin, slender, cylindrical pieces (obtained from the stems,) very light and spongy; white, inodorous; insipid, mucilaginous taste. Consists solely of parenchyma or cellular tissue. Mucilage not precipitated by alcohol.

Lobed; Bands Orange-Color.

MACIS. *The arillus of the fruit of Myristica fragrans.* Mace.

Flat membrane irregularly slit; smooth, soft, flexible; reddish or orange-yellow color; peculiar, aromatic odor and taste. The wild—sometimes called male or long nutmeg—has the bands of the arillus very narrow, more deeply lobed, darker in color, and destitute of odor. The bands of the cultivated or so called "female" are the officinal variety. Contains four to nine per cent. of volatile oil, also fixed oil.

Hairs; Brown, Stiff.

MUCUNA. *M. pruriens.* Cowhage.

The hairs and pods. Coriaceous pod shaped, like the letter *f;* about four inches long, covered with brown, closely set hairs; these are easily separated, of a peculiar appearance, straight and pointed at apex-serrated. Acts mechanically as a vermifuge (irritation relieved by camphor liniment.)

Hairs; White and Soft.

GOSSYPIUM. *G. herbaceum and other species.* Cotton.

A filamentous substance, separated from the seed; differs from the other hairs, in being thin, flattened, and more or less twisted. Consists chiefly of lignin; insoluble substance, but in strong alkaline solutions soluble; by concentrated mineral acids decomposed, by nitric acid converted into Pyroxylon, which is soluble in ether.

Powder; Consisting of Red Glands and Hairs.

ROTTLERA. *R. tinctoria.* Kameela.

The glandular powder and hairs obtained from the capsules by brushing off; obtained from India, Northern Australia, &c. A number of the fruits of the Euphorbiaceæ are covered with such glands. The microscope reveals a depressed globular sac, transparent membrane, filled with a transparent mass. This mass consists of cells containing a red powder. The hairs arranged in stellate forms, red color; color yielded to alcohol and ether. Powder burns with a red flame, and *floats on water*. Adulterations thus detected. *Rottlerin* obtained from the etherial solution.

Powder; Orange-Brown, Bitter.

LUPULINA. *Humulus Lupulus.* Lupulin.

A powder separated from the strobiles by rubbing or threshing, it is contained in the base of the bracts and in the zigzag axis, a large number, constituting from 1-10 to 1-6 the weight of the strobiles. Each gland consists of two hemispheres, one narrow, the other round; the lower one collapses on drying; both sides more or less reticulate; filled with an oleo-resin when fresh. Bitter taste due to *dulcamaric acid.*

Powder; Yellowish, Tasteless.

LYCOPODIUM. *L. clavatum and other species.* Lycopodium.

The sporules very mobile and pale yellow, odorless and tasteless; very light; mixes with water with difficulty; becomes gray when triturated long. Under the microscope they are tetrahedral (four sides) each one forming a triangle. Fifty per cent. fixed oil.

DRUGS DESTITUTE OF CELLULAR TISSUE.

STARCHES.

Of the three classes of drugs—lignin (most insoluble) starch (intermediate) and gums most soluble. All starches are carbohydrates and have the same chemical composition $C_{18}H_{30}O_{15}$ (proper composition); insol. in cold water, but when treated with strong solution of $ZnCl_2$ or $CaCl_2$, rendered soluble, the inner portion most soluble. When heated loses 1-8 its weight, water condensing in the starch, and when dry has the same sp. gr. as C. P. Chloroform 1.54; not capable of undergoing fermentation until converted into sugar; this is done by diastase (the fermenting principle of malt) or dilute acids, which first convert it into dextrine (this latter also formed by continued heat above 212°). Finest quality of starch produced with but little heat. It is found usually in columnar masses, having a somewhat crystalline appearance, produces a peculiar sound when compressed between the fingers; absorbs water in moist air. Converted into oxalic acid by nitric acid.

MARANTA. *M. arundinacea.* Arrow Root.

The fecula of the rhizome; bears a strong resemblance to the starch from the tuber of Solanum tuberosum—common potato starch—both being under the microscope egg-shaped. Maranta more uniform, the hilum on the broad end, while with the potato the hilum is upon the narrow end. *To distinguish.*—Potato starch with hot muriatic acid (112° F.) gelatinizes and has the odor of beans. Maranta, treated likewise, gives no odor.

CANNA. Tou les mois. Canna.

The fecula from the Rhizome of an undetermined species.

This resembles maranta, but is much larger, having the hilum at the small extremity.

AMYLUM. *Triticum vulgare.* Wheat Starch.

Under the compound microscope it appears to consist of lentil or nearly kidney-shaped discs, differing very much in size, having central points and obscurely marked concentric layers. Complete absence of hilum; yields with ninety-six parts of boiling water a somewhat milky mucilage, which is colored violet-blue by iodine. When shaken with ten parts of a mixture, consisting of two parts of hydrochloric acid and one of water, it forms an inodorous mucilage.

TAPIOCA. *Janipha Manihot.* Tapioca.

Irregular, hard, white, rough grains; little taste; partially soluble in cold water; ruptured by heat. Under the microscope the granules are of a muller-shape, uniform in size, and the hilum surrounded by rings. Cracks in a stellate manner.

SAGO. *Sagus rumphii and other species.* Sago.

The starch is deposited in the stems, and consists of hard, globular grains the size of a pin's head or larger; whitish or light brown; ruptured by heat.

Adulterations distinguished by microscope. Tr. idodine *test* for all the above starches (blue color), but if the mucilage of starch be mixed with either tannic acid or quinia, the reaction will be prevented.

GUMS.

Bodies entirely destitute of cellular structure; found in nature frequently as a constituent of vegetable juices; amorphous; chemical composition-carbohydrates (arabic or gummic acid and lime, or arabate-gummate of calcium). Differ from starch in being soluble in cold water, producing ropy solutions destitute of sweetness.

Tears Scarcely Fissured; Glassy, Reddish. Gum Senegal.
Tears Internally Fissured; Glassy, Colorless, Gum Arabic.

ACACIA. *A. vera and other species of Acacia.* Gum Arabic.

Senegal Gum, the common, collected near the river Senegal. Acacia is in irregular tears, three-fourths of an inch or smaller in diameter, nearly smooth and opaque when entire, owing to the great number of fissures present; brittle, breaking into small fragments, separate layers of which are transparent. Senegal has the same appearance, but is of a browner color, much less opaque, few fissures if any being present, when broken the large pieces are transparent; powdered with difficulty. Finest variety of acacia known as Kordofan. Solution of acacia gelatinizes with Tr. Ferri.Chlor. and borax. It is not precipitated by a solution of acetate of lead, but precipitated by a solution of sub-acetate of this metal and by alcohol. Nitric acid converts it into mucic acid.

Zoned Bands or Tears; Containing Starch.

TRAGACANTHA. Tragacanth.
Astragalus verus and other species of A.

Occurs in thin, flat, roundish pieces, which are spirally twisted, curved like a sickle, and traversed by semi-circular, concentric, striated elevations; sometimes in thin, filiform somewhat twisted pieces.. Tough, white or yellowish-white; almost translucent, horny and difficult of pulverization. Swells when macerated in cold water, and yields a thick mucilage with boiling water. Contains about thirty per cent. of *bassorin* (the insoluble portion). The soluble portion yields a precipitate with acetate of lead and mixes clearly with a concentrated solution of ferric chloride or of borax; in these respects differing from a solution of gum arabic. On the other hand, it agrees with the latter in that it is thrown down as a transparent jelly by alcohol and rendered turbid by oxalate of ammonium.

SUGARS.

White, Crystalline, Hard, Very Sweet.

SACCHARUM. *S. officinarum.* Sugar.

White. Granular, Less Hard and Sweet.

GLUCOSE. Grape Sugar.

Syrupy, Brown, Remaining Liquid.

SYRUPUS FUSCUS. *Obtained in Making Sugar.* Molasses.

Cane sugar, or sugar properly so called, derived from the sugar cane, beet and sugar-maple; glucose or grape sugar, with which starch sugar, diabetic sugar, the crystallizable sugar of honey and the sacharine matter of the glucosides are all identical; uncrystallizable sugar; lactin, or sugar of milk, and mannite, are the most important principles distinguished by chemists as saccharine principles. The U. S. P. only recognizes Saccharum officinarum or sugar cane as the source of sugar. The yield is about eight per cent. It is prepared by immediately mixing the juice yielded by the cane with lime. The gluten and albumen rise to the top, and the clear liquid is drawn off, concentrated by heat, and the scum carefully removed. It then crystallizes in the form of small granules of a yellowish color and moist consistence; this dried, forms the brown sugar of commerce. The mother-water by further concentration again yields crystals, and the remaining liquid constitutes molasses. Eight pounds of the juice yields about one pound of sugar.. Brown sugar refined (this is done in various ways) yields about seventy per cent. of white sugar.

SUCROSE, OR CANE-SUGAR ($C_{12}H_{22}O_{11}$).—When pure, is a solid, in large oblique-prisms, of a peculiar, grateful taste, permanent in air, phosphorescent by friction, and of the sp. gr. 1.6. Readily soluble in water, (half its weight in cold, and almost to an unlimited extent in boiling), its solution, when thick and ropy, is called syrup. It is nearly insoluble in absolute alcohol, but dissolves in four times its weight of boiling alcohol, of the sp. gr. 0.83. Heated to 320°F., it melts into a viscid, colorless liquid, which, on being suddenly cooled, forms a transparent, amorphous mass, called *barley sugar.* At a higher temperature (392°F.) it is converted into a black, porous mass, of a high lustre, called *caramel* ($C_{12}H_{11}O_7$) At a still higher heat, it yields *acetone* (C_3H_6O - 572° F.), *metacetone*, *assamar*, and other organic compounds. It is converted into oxalic acid by nitric acid and heat. It is not directly fermentable, but may be by first converting it into glucose or grape-sugar, by the action of H_2SO_4 and heat. It is *not* precipitated by subacetate of lead.

GLUCOSE, OR GRAPE-SUGAR ($C_6H_{12}O_6H_2O$).—Is obtained from honey, starch, &c. It is in the form of crystalline grains or square cubes. It is less sweet and less soluble in water, and much more soluble in dilute alcohol than cane-sugar. Insoluble in ether, and absolute alcohol, and of a sp. gr. 1.36. It is capable of undergoing the vinous fermentation directly without passing through any intermediate state. The name *glucocides* is given to certain organic substances which are resolvable by the presence of acids, &c., into glucose and some other proximate principle; example: tannic acid, yielding glucose and gallic acid; salacin, yielding salaretin and glucose.

UNCRYSTALLIZABLE SUGAR (fruit-sugar), an isomeric form of glucose, found in honey, wine and the juices of fruits, and from starch and cane-sugar by H_2SO_4. It is susceptible of the vinous fermentation without intermediate change. It is levogyre, and in consequence of this it has been termed *inverse sugar*, its rotatory power being reverse to that of the sugar from which it is derived, cane-sugar and grape-sugar both being dextogyre.

TESTS FOR SUGARS.

Polarized light.—Left to right; fermentation;
$C_{12}H_{24}O_{12}=C_2H_6O+4CO_2=$ Glucose.
Troemner.—$CuSo_4+KHO$ yields CuO_2 (red)= "
Fehling.—The same as Troemner, with alk. tartrate.
$CuSO_4+KHO$ yields CuO_2 "
Boettger.—$BiONO_3+Na_2CO_3$ yields black precipit.= "
Schmidt.—$Pb_2C_2H_3O_2+AmHO$ " red " = "

Pettinkofers.—Bile and sulphuric acid yields a red color with cane-sugar. This test may also be used for bile.

SYRUP.—The impure dark-colored liquid obtained in making sugar from S. officinarum. This is of two kinds, the West India and sugar-house. The former is a black, ropy liquid, of a peculiar odor and empyreumatic taste. It can be made to yield rum. The latter has the same general appearance, but is thicker, and of a different flavor. Its sp. gr. is about 1.5, and it contains about 75 per cent. of solid matter. Both consist of uncrystallizable sugar, more or less cane-sugar, gummy and coloring matter.

Whitish Crystals, Very Hard, Slightly Sweet, No Syrup.

SACCHARUM LACTIS. *From whey.* Sugar of Milk.

Sugar of milk, or *lactin,* $C_{12}H_{24}O_{12}$ contained in the milk of mammals, the largest per cent. (five) being obtained from herbiverous animals. It is prepared from whey (left after making cheese), by evaporating to a small bulk and allowing to congeal (small granules). These are refined, dissolved in water and crystallized. This is hastened by the suspension of a stick or twine in the solution. It occurs in commerce in cylinders, never pure white, more or less gray or yellow, very hard, slightly sweet. Soluble (slowly), in six parts cold and three parts boiling water *without* forming syrup; insoluble in ether, slightly soluble in alcohol. Sp. gr. 1.5. Not fermentable, but made so by action of heat and acid, which forms lactose, which is fermentable. At 320° F. it loses H_2O. By action of nitric acid it is converted into mucic (sacchlactic acid). Its principal use is to triturate other substances with, so as to form a fine powder, or as a diluent. It resembles grape sugar in reducing an alkaline solution of copper with precipitation of sub-oxide.

Syrupy, Brownish-Yellow, Aromatic, Becomes Crystalline.

MEL. *Prepared by Apis mellifica.* Honey.

A saccharine liquid prepared by Apis mellifica, the hive bee, deposited in the cells. The finest (virgin honey), is that which is allowed to drain from the comb. This is lighter in color and of a more pleasant odor and taste than that prepared by rupturing the cells by heat. Sp. gr. 1.333. Readily soluble in water, less so in alcohol. Undergoes the vinous fermentation by dilution. Contains grape sugar and mannite

Crystalline Flakes or Amorphous, Brownish, Mucilaginous, Sweet.

MANNA. *Fraxinus Ornus and F. rotundifolia.* Manna.

This is a concrete saccharine exudation obtained from small trees growing in So. Italy, after arriving at the age of four or five years. It is collected during the warm season. That obtained from old trees and from the base of the young trees is inferior. It occurs in crystalline flakes or brownish amorphous masses. Rough light, porous, brittle; sweet, mucilaginous taste; slight, peculiar odor; burns with a blue flame. Soluble in three parts cold and in its own weight of boiling alcohol (purest). The solutions if saturated deposit crystals. Eighty-five per cent. *mannite.*

FATS, OILS AND WAX.

SOLID AND LIQUID FATS.

These are unctuous parts of animal and vegetal bodies secreted in the cellular tissue and separable therefrom by fusion at a moderate temperature. When liquid, they are called oils; when semi-solid, butter or lard; when still harder, suet or tallow, and when brittle, wax (but true waxes are entirely different substances). They are mixtures of several fats of different degrees of fusibility, *e. g.*, olein, stearin, palmitin; the hard fats being chiefly stearin and palmitin, the soft chiefly olein. These are compounds of certain fatty acids—oleic, stearic and palmitic, with glycerine. Leave a fixed stain on paper; are insoluble in water; soluble in ether, benzine, oil turpentine, chloroform, bisulphide of carbon, &c.; scarcely soluble in alcohol. The ultimate constituents are C. H. O. The least fusible contain the most carbon and least oxygen. Boil at about 600°F. and decompose with the evolution of a peculiar pungent disagreeable odor, irritating to the eyes, known as *acroleine.* They are analogous in constitution to compound ethers, being composed of fatty acids with glycerine, *minus* a certain quantity of water, just as ethers are compounds of alcohol with acids *minus* a certain quantity of water. The solid fats most used are *Adeps, Ol. Myristicæ* and *Ol. Theobromæ.*

OLEUM THEOBROMÆ. *Theobroma Cacao.* Cacao Butter.

Obtained by expression from the warm seeds in the shelled state, which yield 45 to 50 per cent. The natural seed consist of about 12 per cent. of shell and 88 per cent. of kernel. Its fusing point is from 84 to 86°F. The chief constituent appears to be stearin, with a small quantity of oleic acid.

OLEUM MYRISTICÆ EXPRESSUM. Nutmeg Butter.

Myristica fragrans.

Solid, unctuous; orange-brown color, presenting a mottled aspect; agreeable odor and fatty, aromatic taste. Obtained by heat and pressure. Yields about 28 per cent.; fuses at 113 F.°

OILS.

They exist ready-formed in nature. The fat vegetal oils are all fixed, while the essential oils are all volatile. The latter exist mostly ready-formed in plants, and are obtained by distillation. They are distinguished from the fat oils not only by their volatility and odor, but by their action with alkaline bases, not being capable of saponification. In plants the fat oils are secreted chiefly in the seeds, as in the olive, poppy, &c., often associated with albuminous matter, gum, mucilage, &c., as in linseed. They are usually divided into two groups—Drying, *e. g.*, Linseed, and Non-drying, *e. g.*, Olive. The latter class become rancid on exposure to the air. They are obtained by expression, or displacement with ether, benzine, chloroform, carbon, bisulphide, &c. They are all lighter than water. Their congealing points vary greatly, olive oil 35.6°F., ground-nut oil 19.4°, almond oil 14°, poppy and castor oil minus 0.4°, linseed oil minus 16.6°. The *animal oils* are constitutionally identical with the non-drying vegetal oils. They are in general propenylic ethers of the fatty acids, so rich in oleic acid as to be fluid at ordinary temperatures, while the corresponding glycerides of palmitic and stearic acids are more or less solid fats, as tallow, mutton-suet and lard.

The liquid fats officinal are:

Oleum	*Amygdalæ Expressum*, from kernels of fruit of A. communis.	Expressed Oil of Almond.
"	*Lini*, from seed of Linum uisitatissimum.	Flaxseed Oil.
"	*Morrhuæ*, from Gadus Morrhua, &c.	Cod Liver Oil.
"	*Olivæ*, from fruit of Olea Europæa.	Sweet Oil.
"	*Ricini*, from seed of Ricinus communis.	Castor Oil.
"	*Sesami*, from seed of Sesamum Indicum, S. orientale,	Benne Oil.
"	*Tiglii*, from seed of Croton Tiglium.	Croton Oil.

VOLATILE OR ESSENTIAL OILS.

These are mixtures of *liquid* hydrocarbons or elæoptenes with oxidized hydrocarbons, stearoptenes, which latter are solid, camphor-like bodies. The odor of vol. oils is closely connected with their oxidation. If distilled in carbonic acid or nitrogen and over lime they are nearly odorless. Air restores the odor. Many distilled waters by keeping in closed vessels become slimy and lose their odor. If kept loosely covered they remain unchanged, and even recover their proper odor when exposed, after change, to air again. Gmelin suggests that this is due to the albuminous and mucous matter carried over in distillation, which, when they putrify, rob the oil of a portion of its oxygen, depriving it of its proper odor.

The most simple group is that which consists of *carbon* and *hydrogen* alone (carbo-hydrogens), as juniper, turpentine, &c. They are isomeric or polymeric with oil of turpentine, represented by $C_{10}H_{16}$.

The *oxygenated*, as a class, are more soluble in water, as mentha gaultheria, fœniculum, &c.

The *nitrogenized* contain hydrocyanic acid, and are obtained of leaves, bark and fruit of several species of rosaccæ, as bitter almond, peach, &c. They possess decidedly sedative and even poisonous properties.

The *sulphuretted*, chiefly from the cruciferæ—oil of mustard, for example—are the most complex in constitution.

The majority are derived from plants in which they exist ready formed (as in the orders labiatæ and umbelliferæ). Some are products of a kind of spontaneous fermentation among principles contained in the plants, in the presence of water (e. g., ol. almonds, ol. mustard); others are the products of the destructive distillation, as ol. tobaci, ol. succini. The general process for preparation is to mix the plants or parts of plants with water, macerate for a certain length of time and subject the mixture to distillation. Some are obtained by expression, as lemon or orange. Their specific gravity varies from .847 to 1.17—boiling point about 300° (ol. of copaiba, 500°).

TEST FOR ADULTERATIONS.

Fixed Oil—leaves a greasy stain when evaporated on paper.

Alcohol—when shaken with water, loses its bulk considerably, and if agitated with fixed oils, the volatile oil will dissolve and the alcohol be separated.

Water—acetate of potasium or chloride of calcium liquifies when mixed therewith.

Examples of vol. oils obtained from

Roots—Ginger, Valerian.
Woods—Rose, Sandal.
Barks—Cinnamon, Canella.
Leaves—Cajuput, Tanzy.
Calyx—Cloves.
Petals—Rose, Orange flowers.
Pericarps—Orange, Cubebs, Pepper.
Seeds—Cardamom, Mustard.
Exudations—Myrrh, Turpentine.

Under the plants, the oils have been referred to and their botanical source given.

Oil, Greenish or Colorless.

OLEUM CAJUPUTI. *Melaleuca Cajuputi.* Oil of Cajeput.

This oil is a transparent mobile fluid, of a light bluish-green hue; odor camphoraceous and somewhat similar to rosemary; bitter, aromatic taste. Sp. gr. 0.926, and remains liquid at 55° F. The green color is said to be due to its distillation in copper vessels—copper being detected by treating with water acidulated with HCl. and testing this with cyanide of potassium; red color. Gives off no vapors with iodine; adulteration with oil of rosemary detected thus.

Crystalline, Colorless; Odor Strong.

CAMPHORA. *C. officinarum.* Camphor.

This concrete substance is found in many plants of the order Lauraceæ. The camphor laurel, however, is the commercial source, a tree which, native of China and Japan, has been introduced into Java and W. Indies. The wood is chopped up, then steeped and boiled in water, when the steam carries over the camphor in vapor. The camphor is deposited around the straw (with which the head of a still is filled), in minute grains. The crude camphor is heated in a vessel from which the steam is allowed to escape at a small aperture and the camphor sublimes as a transparent cake. It is white, tough, solid; slightly lighter than water; sparingly soluble in this liquid, freely in alcohol, ether, acetic acid and the essential and fixed oils; fuses at 347°; boils at 399°. Very inflammable, burns with a smoky flame. The *Borneo* camphor is the product of *Dryobalanops aromatica*, a large tree of the order Dipteraceæ. It is found in natural cavities of the wood in crystalline masses. The composition of camphor is $C_{10}H_{16}O$. By treatment with various reagents it yields a number of interesting products. Cymol $C_{10}H_{14}$. Camphoric acid $C_{10}H_{16}O_4$, &c. Forms compounds with iodine and bromine, the most important of which is mono-bromated camphor, obtained by heating equal portions of bromine and camphor to 172°. One-half the bromine is given off as hydrobromic acid, the other forms the mono-bromated camphor—$C_{10}H_{15}BrO$.

CERA ALBA. { *Oleum Camphoræ.* *C. officinarum.* } Oil of Camphor.

Yellowish or brown; limpid liquid; invariably containing camphor in solution, which crystallizes out on cooling.

WAX.

CERA FLAVA. { *A peculiar concrete substance, prepared by Apis mellifica.* } Yellow Wax.

The vegetable world furnishes a number of wax-like bodies, almost every plant secreting a wax-like substance, especially in the seeds and fruit. The animal kingdom likewise furnishes several varieties—*e. g.*, Chinese wax,—spermaceti; (these however are not true waxes, not containing *melissic acid*) the officinal is the typical bees-wax of which bees form their cells. It is the honeycomb of the hive bee. It is of a yellow color, agreeable odor, feels a little greasy but more sticky, and moulds readily under the warmth of the fingers; sp. gr. 960 to .965. Bleached by exposing thin sheets to the light, it yields the WHITE WAX, which is somewhat less fusible than the yellow (fuses at about 145° F.) A number of chemical processes are used for bleaching; among the number, bichromate of potash and sulphuric acid, nitric acid and chlorine, &c. It consists essentially of three substances, separable from each other by alcohol; *myricine,* insoluble in boiling alcohol (consisting chiefly of *palmitate of melisiyl*); *cerotic acid,* dissolved by boiling alcohol, crystallizes on cooling; *ceroline,* soluble in cold alcohol (the body to which the color, odor and tenacity is due). *Adulterations,—Suet,* gives it a fatty feel and disagreeable taste; *Resin,* soluble in cold alcohol; *Pea or Bean meal,* insoluble in ol. turpentine, &c.; *Paraffin* makes it have a lower fusing point; also detected by heating with strong sulphuric acid, which destroys the wax, forming a black, jelly-like mass, while paraffin is left as a transparent mass on the surface. Pure wax congeals with a convex surface, but the presence of paraffine gives it a *concave* and *translucent* appearance. Chloroform should not dissolve over 25 per cent.; if it does, it is probably impure from Stearin or Stearic acid. White wax should melt below 150°, yellow, below 140°.

EXTRACT-LIKE DRUGS.

SWEET.

EXTRACTUM GLYCYRRHIZÆ. Liquorice.
G. glabra and G. echinata.

Cylindrical rolls, very black, dry, brittle; breaks with a shining fracture; very sweet, peculiar taste. A bitter or empyreumatic taste is a sign of inferior quality. Some are entirely soluble in cold water, others leave a large residue undissolved. The residue (soluble in alkaline solutions) contains probably Pectin and some *Glycyrrhizin.* The latter principle is precipitated from a strong aqueous solution by acids. When washed with dilute alcohol and dried, it is an amorphous yellow powder; bitter, sweet taste, acid reaction. It is combined with ammonia in the root; the extract, when heated with potash evolves ammonia. Its solution in hot water, gelatinizes on standing.

BITTER.

ALOE BARBADENSIS. *A. vulgaris.* Barbadoes Aloes.
ALOE CAPENSIS. *A. spicata and other species of A.* Cape Aloes.
ALOE SOCOTRINA. *A. Socotrina.* Socotrine Aloes.

ALOES.—Derived from several species of aloes furnishing a bitter juice (extracted from leaves), which when inspissated furnishes the drug. The difference in the several commercial varieties is due not only to the species employed but method of extraction.

Socotrine. From Isle of Socotra and neighboring districts. Also called, when opaque and liver-colored, *Hepatic Aloes*; imported in casks and tin-lined boxes; best quality of a dark, reddish-brown color, agreeable odor, comparable to myrrh or saffron, due to the presence of a small quantity of vol. oil; shining, resinous fracture; taste bitter, slightly aromatic. Very thin layers under the microscope reveal abundance of crystals.

BARBADOES. From Barbadoes and West Indies. Deep chocolate-brown. A variety is often seen having a smoother, glassy fracture, but by keeping, it passes into the other variety, which has a clear, dull, waxy fracture; odor distinguishable from Socotrine, very slightly aromatic. Imported in gourds and boxes.

CAPE. From Cape of Good-Hope. Brilliant, conchoidal fracture; bright, bottle-green mass, red by transmitted light. No crystals seen under microscope. Odor, sourish; taste, nauseous.

NATAL. Imported from Natal. Grayish-brown and very opaque; contains a crystalline principle found in no other kind. In preparation, the leaves are cut obliquely into slices, and the juices are allowed to exude in the hot sunshine, then evaporated in iron pots. Great care is taken to prevent burning; not as much care in preparation of other varieties.

The most interesting constituents are the *Aloins*, which are prepared in a general way, by dissolving out the amorphous substance, with about an equal quantity of alcohol, at 48° C. The crystals separated on a filter, washed with cold spirits. (They exist to about 16 to 25 per cent.)

Barbaloin, crystallizes in tufts. Nitric acid produces a crimson color.

Socaloin, acicular prisms. Nitric acid little effect.

Nataloin, rectangular scales. A minute quantity added to a drop or two of sulphuric acid, then allowing the *vapor* of nitric acid to pass over the surface, it assumes a fine blue, which is permanent while cold. With Barbaloin, this color soon fades. With Socaloin, this reaction is not produced.

PAULLINIA. *P. sorbilis.* Guarana.

Prepared from the seeds of Paullinia sorbilis—a climbing shrub of Brazil. Nat. Ord. Sapindaceæ. The seeds are dried, powdered then moistened and made into a paste, this mixed with more of the seeds, either whole or bruised, is rolled into cylinders, which on drying form a hard, mottled, reddish-brown mass. P. Cupana growing on the banks of the Orinoco river is also said to yield it Contains a principle analogous to *caffeina*, which is crystalline. Its effects are generally very good in sick headache, but like all such neuralgaic remedies is very uncertain. Dose ranges from twenty grains to a drachm. Constituents not as yet well defined.

ASTRINGENT.

A. Green with Ferric Chloride.

CATECHU. *Acacia Catechu.* Catechu.

Catechu or cutch, an extract from the wood of two species of Acacia—A. Catechu which has a dark gray or brown bark, A. Suma, a white bark—the former abounds in tropical Eastern Africa, the latter in South India. *Preparation.*—A decoction of the chips is evaporated to an extract, which is further dried in the sun. It is a dark brown, brittle substance, slightly granular, fracture somewhat shining; astringent taste, with a sweetish after-taste. Ether extracts *catechin,* which is the sparingly soluble (in cold water) portion of catechu. This principle differs from tannin in not precipitating gelatin, tartar emetic and the alkaloids. Converted by long boiling into *catechu-tannic acid* which latter exists in catechu ready formed but associated with catechin, from which it is very difficult to separate. When catechu is sublimed it yields the interesting principle found in other substances (areca-nut, kino, gambier, tar, &c.), called *pyrocatechin.* Dilute acids occasion a precipitate with infusion of catechu. The dark green precipitate of ferric chloride is turned purple by a mere trace of an alkali.

GAMBIER. *Uncaria Gambir.* Gambir.

(Ord. Rubiaceæ).

The name of Cutch or Terra Japonica is often applied to this substance, and Gambier is sometimes used in the name of catechu. This is extracted from the leaves, tops and young shoots by decoction and evaporation. It is an earthy looking substance of a light brown hue; it also comes in pale brown, dark brown and blackish pieces. It is generally found in cubes (the best), but often in irregular pieces; friable, devoid of odor. Under the microscope both catechu and gambier display minute acicular crystals.

KINO. *Pteroarpus Marsupium and of other plants.* Kino.

The dried exudation of the tree found in forests of the Malabar coast. Comes in angular fragments, easily splitting into smaller transparent pieces of a garnet hue. Amorphous under the microscope. Its solution (acid to litmus), gelatinizes by standing. It developes an intense violet color in presence of a proto-salt of iron (catechu or gambier do not give this reaction), ferric chloride (producing a dirty green precipitate), is reduced to a ferrous salt. Dilute mineral acids or alkalies do not occasion any decided change of color, the former producing a precipitate; (*Kino-tannic acid*), an aqueous solution of which on boiling separates *Kino red.*

B. Blue with Ferric Chloride.

MONESIA. *Chrysophyllum glycyphlœum.* Monesia.

A vegetable extract believed to be derived from the bark of Chrysophyllum glycyphlæum growing in the forests near Rio Janerio. The extract is of a dark brown to a black color; very brittle fracture; taste, first sweet, then astringent, finally acrid; entirely soluble in water. *Monesin* is the acrid principle.

EXTRACTUM HÆMATOXYLI. Extract of Logwood.
H. Campechianum.

A decoction of rasped logwood is strained and evaporated to dryness; should be dry, brittle when cold, deep ruby color; astringent, sweetish taste. Prepared largely in Yucatan and other parts of Mexico. Its coloring principle known as *Hœmatoxylin* or *Hematine.*

MILK JUICES.

INSOLUBLE IN WATER.

CAOUTCHOUC. *Siphonia elastica.* India Rubber.
Gum Elastic.

Obtained from numerous lactescent plants growing in Brazil and Central America, by incision. The opaque milk-like juice exuding concretes on exposure. When pure it is white or nearly so, blackened by heat and absorption of smoke. Chemically it is a hydrocarbon. Insoluble in water and alcohol, swells in a large number of liquids; soluble in chloroform and bisulphide of carbon. Fuses at 268°; with fat forms adhesive compounds; addition of sulphur forms vulcanized rubber. The common adulterations are carbonates of zinc and lead.

GUTTA-PERCHA. *Isonandria gutta.* Gutta-percha.

Same composition as Caoutchouc. Obtained from a large tree growing in Singapore by felling and making incisions, boiling and evaporating the juice which exudes therefrom. In brown or yellowish masses; white when pure; impure contains resins which can be extracted by alcohol at an ordinary temperature; solid, not elastic; at 150° becomes soft and plastic and may be moulded. Insoluble in water, slightly in alcohol and ether, and readily in bisulphide of carbon, turpentine and chloroform.

PARTLY SOLUBLE IN WATER.

LACTUCARIUM. *Lactuca sativa.* Lactucarium.

The milky juice obtained by wounding inspissated; by exposure to the air, constitutes the drug. Resembles opium in color, smell, &c., and hence called lettuce opium. The color, however, is of a reddish-brown and comes in irregular lumps or cakes. The yield of spiritous extract is about thirty-five to forty-four per cent. Contains three distinct bitter principles,—*Lactucerin* or *Lactucone, lactucin* and *lactucic* acid.

OPIUM. *Papaver somniferum.* Opium.

The concrete juice obtained from the unripe capsules, by incision and spontaneous evaporation; rolled into balls of various sizes, wrapped in leaves of Rumex. *Good Opium* has a peculiar, strong, narcotic odor, and a bitter, somewhat acrid taste. When long chewed it excites irritation in the lips and tongue; reddish-brown or deep fawn color; compact texture; yields its virtues to alcohol (four-fifths), and water (three-fourths), and dilute acids, not to ether. Inferior opium has a blackish color, weak or empyreumatic smell, a sweet or slightly nauseous, bitter taste; soft, viscid, greasy consistence; dull fracture, or an irregular, hetrogenous texture from the intermixture of foreign substances. Good opium will not impart a deep brown color to the saliva, nor leave a dark uniform trace when drawn over paper (which indicates licorice, &c.), nor form a thick, viscid solution with water (indicates starch). Should yield when dry at least ten per cent. morphia. Loses twenty per cent. by weight on drying. *Antidotes,* first, sulphate of zinc or alum; subsequently, coffee or caffeina; as a direct antidote, atropia or belladonna. For solubilities and tests of its constituent alkaloids, morphia, codeia, &c., see TABLE OF ALKALOIDS.

RESINS.

These are solid bodies usually associated with vol. oil, from which they are derived by a process of gradual oxidation. When both are abundant, a fluid, *Oleo-resin*, results. When associated with gum, *Gum Resin is* formed. The term *Balsam* is applied to liquid exudations containing resin, volatile oil, benzoic or cinnamic acids or their ethers. Benzoin being a resin associated with the above acids, forms a connecting link between the resins proper and balsams; the latter are intermediate between benzoin and oleo-resins.

GUM RESINS WITH VOLATILE OIL.

ASSAFŒTIDA. *Narthex Assafœtida.* Assafœtida.

This oleo, gum resin found in Persia and North Hindostan is obtained by incisions at the root of the plant; the juice which exudes, congeals in the atmosphere, *without exposure to the sun.* It comes in masses or tears (the latter the purest kind); at first soft, by exposure hardens and becomes a bright pink, then a brown hue. The perfectly pure tears have a conchoidal fracture, exposing a white (changing to a purplish pink) surface; a powerful, persistent, alliaceous odor, and a bitter, acrid taste. Composition—resin, gum, essential oil. The latter is sulphuretted. The resin is not wholly soluble in ether or chloroform.

GALBANUM. *Ferula erubescens.* Galbanum.

The botanical source uncertain. Comes in distinct or agglutinated tears of irregular shape, from the size of a pea to that of a hazel-nut. Pale yellow, or brownish-yellow color; balsamic odor;

acrid, bitter taste. Contains the interesting principle (common to many umbelliferous products) *umbelliferone;* acicular crystals; gives a brilliant blue fluorescence by addition of alkali; by distillation, yields a blue oil, analogous to Ol. Matricaria Chamomilla. The resin—60 per cent. is soluble in ether and alkaline liquids. The mucilage it contains not examined.

AMMONIACUM. *Dorema Ammoniacum.* Ammoniac.

The stem of this tree, which abounds in Persia, flows, with the slightest puncture (the agent generally a beetle, many of which pierce the stem); a milky juice flows, which speedily hardens, partly adheres to the stem and partly falls to the ground. In roundish tears of various sizes sometimes embedded in a brownish mass. Yellow or yellowish-brown externally; waxy fracture; translucent at the edges; peculiar odor; acrid, bitter taste. The brown colored, intermixed with much impurity, should be rejected. Resin (about 70 per cent.) composed of two—an acid and an indifferent resin. It yields no umbelliferone.

OLIBANUM. Frakinscence.

Various species of Boswellia, found in Eastern Africa.

Longitudinal incisions made in the bark repeatedly. The thickened exuded juice is in a few weeks after collected. At first soft, soon hardens. Comes in roundish tears of different sizes, color varying from a whitish to a brownish-red, with a powdery surface. The tears are friable, and leave a waxy lustre. Softens in the mouth, producing a sensation of coldness. Taste terebinthinous; by heat diffuses a balsamic odor. Twenty-seven to thirty-five per cent. of gum; resin not soluble in the alkalies.

MYRRHA. *Balsamodendron Myrrha.* Myrrh.

The Myrrh trees found in Egypt, Nubia, Abyssinia and Arabia, exudes the gum from the bark like the Cherry tree. Comes in irregular forms and sizes, covered with dust. The pieces are somewhat roundish, but have an uneven surface. Yellowish, or reddish brown color, sometimes marked with light colored veins. Peculiar, balsamic odor; bitter taste. Soluble (a large portion) in water, forming a yellowish brown and turbid emulsion; lesser part taken up by alcohol. Nitric acid added to tincture produces a violet color.

The per centage of gum reaches sometimes sixty-seven. Differs from Acacia by being partially precipitable by neutral acetate of lead. Resin entirely soluble in chloroform and alcohol.

FREE FROM VOLATILE OIL.

GAMBOGIA. *Garcinia morella, var. pedicellata.* Gamboge.

The tree with handsome laurel-like foliage, found in Camboja, Siam, and Southern parts of Cochin China, is tapped by making a spiral incision in the bark, round half the circumference of the trunk, the juice received in bamboo, in which it hardens. Comes in form of cylinders, striated lengthwise, with impressions from the inside of the bamboo; sometimes found in shapeless masses. Brittle; orange-yellow color; powder, lemon-yellow. Inodorous and tasteless, sweetish after-taste; causes a burning sensation in the mouth; gives a yellowish emulsion, with water. Contains 15 to 20 per cent. of gum. The resin precipitated from alkaline solution by acids.

EUPHORBIUM. *Euphorbia resinifera.* Euphorbium.

From Morocco. Obtained by making incisions in the green, fleshy branches of the plant. The acridity of the exudation is so great, that the collectors tie a cloth over the mouth and nostrils to prevent the entrance of the irritating dust. The properties of the drug are so irritating that it is very difficult to powder; alarming symptoms are sometimes produced with violent sneezing. Comes in dirty yellowish, round, somewhat three-cornered pieces, frequently perforated with from one to three holes.

SCAMMONIUM. *Convolvulus Scammonia.* Scammony.

The dried milky juice obtained by tapping the roots of the plant. It is extensively adulterated by collectors, as well as dealers. While yet soft, such things as flour, carbonate of lime, wood ashes, earth, gum arabic and tragacanth are used. When pure it is an amorphous, transparent, brittle substance, yellowish-brown color. The fine scammony of commerce, “ virgin scammony,” comes in flat, irregular lumps, which have a dark gray or blackish hue, gives an ash-gray powder; a cheesy or putty-like odor; not much taste, but leaves an acrid sensation in the throat. Scammony that is heavy, dull and clayey, that does not *yield at least eighty per cent. of matter soluble in ether, should be rejected.* The clumsy adulterations with starch, lime, &c., can be easily detected even by the inexperienced.

RESINS FREE FROM BENZOIC AND CINNAMIC ACIDS.

SANDARACA. *Thuya articulata.* Sandarach.

This is a natural exudation—from N. Africa. Small grains, size of a pea; yellow color, glassy fracture and shining; resembles mastiche somewhat; when heated it diffuses an agreeable odor; melts and enflames; soluble partly in cold alcohol, completely so in hot alcohol and oil of turpentine.

MASTICHE. *Pistacia Lentiscus.* Mastic.

This is a natural exudation, also produced by incision—from Greece. In somewhat spherical, pale yellow, friable tears; freshly broken pieces are glassy, shining and transparent; becomes soft when chewed. Eighty to ninety per cent. soluble in alcohol, and called *mastichic acid;* the remaining known as *masticin.*

GUAIACI RESINA. *Guaiacum officinale.* Guaiac.

Produced by exudation from incision and dried by heat—from W. Indies. Occurs in globular pieces or in irregular masses, a greenish powder oftentimes covering the outside. It is friable, a nearly chestnut-brown, and glassy fracture; slight odor; colored green or bluish by oxidizing agents. Soluble in alcohol and solution caustic potassa. Impurities, bark and wood. Contains *guaiaconic acid* seventy per cent., *guaiaretic acid* ten and one-half per cent., and *guaiacic acid.*

RESINS WITH CINNAMIC AND BENZOIC ACIDS.

BENZOINUM. *Styrax Benzoin.* Benzoin.

From E. Indies. By incision, the liquid which exudes hardens; either in agglutinated, shining tears of a yellowish-brown or reddish-brown color, and internally milk white; or in solid reddish-brown masses interspersed with paler tears. It has a very agreeable vanilla-like odor. By sublimation, yields fifteen to twenty per cent. of *benzoic acid* sometimes contains *cinnamic acid.* (The Penang or Sumatra Benzoin, consisting of numerous whitish opaque pieces, imbedded in a scanty pale brown mass, is sometimes an adulteration. It has the odor of styrax; when boiled with milk of lime, on the addition of permanganate of potassium, exhales the odor of bitter almond).

STYRAX. *Liquidambar orientale.* Storax.

From bark steamed with water and pressed; an opaque mass of a more or less gray color, and the consistence of rather thick (Canada) turpentine. Contains some water, *styrol* and *cinnamic acid.* It is almost entirely soluble in alcohol.

BALSAMUM PERUVIANUM. Balsam Peru.
Myrospermum Peruiferum.

From S. Amer. A dark brown liquid showing, in thin layers, a purplish-brown color by transmitted light; of a syrupy consistence; has an acid reaction. Portions of the bark are bruised by beating with blunt instruments, and subsequently charred by flame; a week or so later the injured bark comes away, and the balsam, which now begins to exude from the exposed wood, is collected on cloths, from which it is separated by gentle boiling in water; the water decanted and the balsam collected in vessels. Contains *cinnamein—a benzylic cinnamate.*

BALSAMUM TOLUTANUM. Balsam Tolu.
Myrospermum Toluiferum.

The tree which produces this exudation grows in Venezuela and New Granada. The balsam is obtained by slashing the bark of the stem through to the wood in many places, and allowing the juice spontaneously into flow into small calabashes fixed to the tree. In the recent state it is soft, yellowish, of the consistence of thick (European) turpentine, turns brownish, and ultimately quite brown, solid, and sometimes crystalline; fragrant odor; aromatic, somewhat sweetish taste. Soluble in alcohol, chloroform, solution caustic potassa. Insoluble in benzine and bisulphide of carbon. Contains an *amorphous resin* and *cinnamic acid.*

RESINS WITH VOLATILE OIL—OLEO BESINS.

COPAIBA. *Copaifera multijuga, and other speies of C.* Copaiba.

This so-called balsam is an exudation of a number of trees of the genus Copaifèra, natives of the warmer countries of South America, but the chief source being from the species multijuga (many leaved). In the trunk of the tree there is made a wedge-shaped gash near the base; from this wound the oleo-resin flows abundantly. It is a more or less viscid fluid; from a pale yellow to a light golden-brown; rather pleasant, aromatic odor; a persistent, bitterish taste. Contains forty to sixty per cent. of vol. oil, and a resin called *copaibic acid.* Copaiba, rich in resin, of an acid character, unites with the alkaline earths, forms a solid mass. (Eight to sixteen parts of balsam warmed with one part of magenesia, is about the proportion necessary). When copaiba is mixed with one-half the quantity of aq. ammon., a clear liquid is formed; if fixed oil is present, turbid. Test.—Into a tube put nineteen drops of bisulphide of carbon and one drop of copaiba; shake together; then add one drop of a mixture of equal parts of strong sulphuric and nitric (1.42) acids. Copaiba gives a reddish-brown color, deposit of resin on sides of tube; wood oil, color intense, purplish-red, becoming violet after some minutes; oleo-resin hardwickia (an exudation used in India, properties of copaiba), no perceptible alteration, the mixture remaining pale greenish-yellow.

TEREBINTHINA. Turpentine.

Pinus palustris and other species of P.

This is a term applied to certain vegetable oleo-resins which exude from coniferous trees—pine, fir and larch. It is obtained in different ways, according to the primary formation of resin ducts and subsequent diffusion of the resinous juices through the heart wood of the various species. Sometimes the trees are tapped by incision, other times bored by an auger, &c., but generally they are obtained by making an excavation, having a capacity of about three pints, in the trunk of the tree, in which the exuded juice accumulates, which is collected, washed with warm water, and purified by straining through straw filters. They are viscid solutions of resin in a volatile oil. American turpentine is chiefly procured from the *Pinus palustris*—*White turpentine*, (also Pinus Tæda); the principal supply comes from N. Carolina and the S. W. part of Virginia, but in the near future Georgia and Florida will no doubt furnish large amounts of this valuable product. As we find it in commerce it comes in large, opaque, solid masses, tenacious, yellowish color, strongly adhesive; when cold it becomes hard and brittle, rendered soft by heat. At a high heat it burns with a white flame and much smoke. Soluble in alcohol and ether and unites with fixed oils. By distillation yields fifteen to thirty per cent. of a volatile oil known as spts. of turpentine, more properly called;

OLEUM TEREBINTHINÆ. Oil of Turpentine.

Pinus palustris and other species of P.

This is a limpid, colorless fluid, of a strong, penetrating, peculiar odor, and of a warm, pungent, somewhat bitterish taste. Like volatile oils in general, it undergoes *resinification* by exposure to the air. With hydrochloric acid it forms a camphor or "*muriate of camphene.*" Sp. gr. .860.

Resina.—Resin or Rosin is the residuum after the distillation of the volatile oil. Rosin (or colophony) when melted and agitated with water becomes of a whitish color and forms white rosin. When pure, it is yellowish brown, inclining to olive; solid, brittle, of a smooth, shining fracture; faint odor. Warm, diluted alcohol converts it into *abietic acid*, of which it yields 80 to 90 per cent. The dilute alcohol only serves to add water into its composition; rosin being the *anhydrde of abietic acid*. By distillation, rosin furnishes rosin oil as a distillate, and pitch as a residuum.

Pix Liquida.—Tar, strictly speaking, is a turpentine with empyreumatic impurities, obtained from the wood of Pinus palustris by slow combustion without flame. It is a blackish, semi-liquid substance of a peculiar odor and sharp taste; sometimes under the magnifying glass, crystals of *pyrocatechin* can be seen. It has a decided acid reaction, readily miscible with alcohol, glacial acetic acid, ether, fixed and vol. oils, &c. Tar water that does not give the reaction of pyrocatechin, is of not much value—with per-chloride of iron, a dark green color, changing to black after a few minutes, and becoming red on the addition of potash. In some sorts of tar, this reaction does not occur, it having been exhausted by water.

TEREBINTHINA CANADENSIS.

Canada Turpentine.
Balsam of Fir.

Abies Balsamea.

(*Silver Fir or Balm of Gilead Tree.*)

The thick, terebinthinate sap, which collects in blisters beneath the epidermis. On the trunk of young trees, these blisters are punctured and the balsam gathered as an article of commerce from Canada, Nova Scotia and Maine; light, transparent, honey-like consistence, becomes thicker, darker, but always retains its transparency. Aromatic odor. The essential oil yields no crystals by hydrochloric acid, but on the addition of nitric acid crystals readily form; soluble in 78.7 parts absolute alcohol, and in 21.3 parts ether. Glacial acetic acid similar to absolute alcohol; hence it is inferred, it is composed of two resins, each having the above solubilities.

TEREBINTHINA VENETA.

Venice Turpentine.

Larix Europea. Pinus Larix. (S. & E. Europe.)

This is so commonly adulterated or substituted that a description is unnecessary. It may be said, by way of distinction from Canada turpentine, that the essential oil yields crystals with hydrochloric acid, and it is soluble in alcohol, glacial acetic, acetone and amylic alcohol. The commercial article sold as genuine, is an artificial mixture of turpentine and rosin. It may be distinguished from the genuine product of the larch, by the facility with which it dries when spread on a piece of paper, and by its stronger turpentine odor.

PIX BURGUNDICA. *Abies excelsa.* Burgundy Pitch.

(*Norway Spruce; Native of Europe and Northern Asia.*)

PIX CANADENSIS. *Abies Canadensis.* Hemlock Gum.

(*Hemlock Spruce; of U. S. and Canada.*)

These pinic resinous exudations are collected about the same as the foregoing. The resins, however, after being removed from the wounded trees, are melted with water, in large boilers and then strained through coarse cloths. They are hard, brittle, quite opaque, of a yellowish-brown color, weak, terebinthinate odor and taste. They are, like the other turpentines, mixtures of the same amorphous resin, with essential oil of the composition $C_{10}H_{16}$. This resin yields, by hydration, the same acid, namely, *abietic* or *abietinic*, which has in former times been described as *pinic, sylvic* and *pimaric acids.* These terebinthinous juices are collected and sold either in their natural state as turpentine, or deprived more or less completely of their volatile oil, in which condition they are represented by *Pitch* and finally by *Rosin.*

SUCCINUM. Amber.

A fossil resin, usually of a pale yellow color, sometimes nearly transparent. Brittle; permanent in the air, having a vitreous fracture. Found in many parts of the world in deposits of cretaceous, or more recent age, said to be the resinous exudation of several extinct coniferæ. Our market is mostly supplied from the shores of the Baltic. Amber is employed principally in the arts, in making ornaments. In Pharmacy, it is used to prepare the oil and *succinic acid.* By roasting, it is rendered soluble in linseed oil and turpentine. The solution constitutes amber varnish. By destructive distillation, the *crude oil of amber* is obtained, along with empyreumatic products.

ANIMAL DRUGS.

ANIMALS.

Insecta. Coleoptera.

CANTHARIS. *C. vesicatoria, Lytta vesicatoria.* { Spanish Flies. Cantharides.

Indigenous to So. part of Europe, along base of the Mediterranean, as far east as Russia, and as far north as Germany. They are not flies, but beetles. They are generally found on the ash or elder, feeding upon the leaves, appearing in May or June. Caught on a cool morning (appear then to be stiff), and killed by steeping in hot vinegar, or by placing in a bottle containing ether or turpentine (the latter mode considered the best). Only the full-grown beetles possess vesicating properties. The variety imported from So. Russia is characterized by its somewhat copper-red tinge. Cantharides generally are characterized by their golden-green wings of a metallic lustre. They are about an inch in length, by two to three lines broad, having a somewhat large heart-shaped head, bearing two black, jointed, thread-like feelers (antennæ), rectilinear and consisting of eleven joints, the lower three green, the upper eight black, a longitudinal groove is seen on the upper side of head; the thorax, which is about as wide as the head, is also longitudinally grooved; the body is entirely covered by the shining golden-green wing cases, these are long and flexible, having a longitudinal groove on each side. Underneath these cases are the brownish, membranous, perfect wings, which cover the entire body. All parts, with the exception of the wings proper, have the same peculiar green color. Of a peculiar odor, and when fresh, emit a vesicating liquid. When dry the odor is much lessened, but may be made manifest by moistening. Acrid, burning, urinous taste. *Cantharidin*, its vesicating principle, is predominant in the soft parts (body and intestines), and worm-eaten cantharides, contrary to the popular belief, are worthless. Good varieties contain about .5 per cent., but they are considered fit for use when containing two-fifths of one per cent. When the beetles are kept for some time the amount of this principle decreases, owing to their containing naturally, small quantities of magnesium, calcium, and other inorganic compounds, and by the influence of these and time the cantharidin is converted partly into an insoluble ammonia-compound. Cantharidin is in the form of white or yellowish crystalline scales, of a shining micaceous appearance, inodorons and tasteless. Insoluble in water, but if the beetles are treated with hot or cold water, the cantharidin is yielded to it, because the peculiar coloring matter the beetle naturally contains renders it soluble; when deprived of this coloring matter, they do not yield this principle to water. It is soluble in alcohol, ether, chloroform, oil of turpentine, acetic ether, &c.; volatilizes at 212° F. Process.—Exhaust cantharides by means of chloroform, evaporate, separate fatty matter by carbon bisulphide. If old beetles are employed then acetic ether is best to use; as it takes up the principle that exists combined with ammonia Cantharidin is also soluble in alkalies, and is by them converted into *Cantharidic Acid,* and upon supersaturating the alkaline solution, the cantharidin separates. The acid has no vesicating properties. The beetles also contain a fixed oil, which in the pure state is a yellow compound of stearin, palmitin, &c. C. vittata (American potato-bug), are employed for the same purpose; they contain about two-fifths of one per cent. of cantharidin. Mylabris cichorii and phalerata (Chinese beetles), are also employed for their vesicating properties. These are large, with a black body and wing cases, the cases split on each side, and with yellowish stripes running transversely across; devoid of the metallic lustre. Same odor and taste, and contain a large per cent. (about one), of cantharidin. The powder of cantharides is greenish-brown, interspersed with shining-green particles (the remnants of wing cases, &c.)

Insecta, Hemiptera (*Half-Winged*).

COCUS CACTI. *Female insect of C. cacti.* Cochineal.

Indigenous to Mexico, W. I., &c., living upon Opuntia cochinillifera—a large cactus. The male insects are small and winged, about one male to 200 females. The female about twice as large, and wing less. They are planted on the above cactus, and allowed to impregnate; after impregnation they swell, and deposit many eggs, then die, leaving the eggs to be hatched by the sun. About three harvests are obtained each year. They are then brushed off, steeped in hot water. When dried shrink one-third. They appear about one-eight inch in diameter, flat on one side, hemispherical on the other (back), showing numerous transverse rings, filled between with a silver-gray wool. These constitute the *silver-grains*. Another variety, the *black-grains*, is most highly valued by the dyers, containing a larger per cent. of coloring matter. They differ from the above in having purple wool between the rings. Adulterated by rolling the gray in gum water and then in finely powdered black lead and cochineal, this to imitate the black; also by rolling the gray in fluor-spar to increase weight; both adulterations are easily detected by placing the insect in water, the metallic substances subsiding, and can then be tested. They are chiefly valued for their coloring principle—*carminic acid*. *Carmine* is formed by adding alum and cream of tartar to an infusion of cochineal in proper proportions. *Lakes* are formed by adding alum and ammonia in proper proportion to an infusion.

Vermes. Annulata.

HIRUDO.

Sanguisuga medicinallis.	Spreckled Leech.
Sanguisuga officinalis.	Green Leech.

South Europe and U. S. An aquatic worm with a flattened body, tapering towards each end, with transverse marks and six longitudinal stripes.

PARTS CONTAINING $CA.CO_3$.

Sepia officinalis.	*Aphalopoda.*	*Os Sepia,*	80	*per cent.*	*Ca CO_3*
Ostrea edulis.	*Conchiniferæ.*	*Testa*	98	"	"
Astacus fluviatilis.	*Crust Decapoda.*	*Lapis Conchorum,*	63	"	"

Os Sepia, or Cuttle Fish Bone.—The oval, cellular, calcareous structure situated underneath the skin in the back. Found in Mediterranean Sea, sometimes floating. It is oval-oblong, five to ten inches long, by one to three broad, somewhat convex on both sides, with thin edges, rather firm on the upper surface; very friable beneath, and composed of numerous loosely-connected layers. The whole mass appearing of a porous consistence. Very light, of a cream color, feeble odor, saline taste. Used in tooth powder, &c.

Testa, or Oyster Shell, is prepared for use in a similar manner to creta præparata.

Lapis, or Crab's Eye, are excretions in the intestines of the crawfish; obtained in large quantities in Russia and Poland. They are inodorous, insipid, somewhat hemispherical, of a whitish or reddish hue, hard, stony consistence, and laminated texture, weighing from one to twelve grs. each. They are not completely dissolved by HCl or HNO_3, and the residue consists of a gelatinous substance of the same shape as the original mass; this is put to use as a test for the genuine, the artificial ones falling to pieces on application of this test.

GELATINS.

Translucent, Some Membranes. *Ichthyocolla.*
Translucent, or Opaque. *Gelatina.*

GRANOIDEA. *From Acepenser Huso and other fishes.* Isinglass.

Consists of the swimming bladder of the sturgeon, and other fishes. Several varieties known in commerce, *long staple, short staple, leaf, book* and *cake.* The long staple and leaf varieties being considered the best; these are remarkable for their iridescence by transmitted light; 100 grs. form a transparent jelly with ten ozs. of water and should leave only 2 grs. of residue. The cake var. is brownish and of an unpleasant odor. Inferior varieties are prepared from the intestines. American isinglass is prepared from the hake (Gadus merluccius). This is in the form of thin ribbons—several feet in length and about one and a half inches wide; it dissolves in water nearly as well as the Russian var., but still retains a fishy taste and odor; unfit for medicinal purposes. Pure gelatine is whitish, semi-transparent, shining pearly, destitute of smell; of an insipid taste, opalescent, in cold water softens and swells; dissolves in hot water, insoluble in alcohol. The inferior kinds are yellowish and opaque.

Glue, which is prepared from bones, hides of animals and other organic matter, differs from the above only in transparency, odor and taste. Gelatine is precipitated by tannin—a sensitive test.

SOFT SECRETIONS IN SACS.

Castor-fiber. Oval or Pyriform; No Hairs.

CASTOREUM. *Mammalia. Rodentia.* Castor.

Chiefly derived from Missouri and Russia, from 33°–67° N. lat. Between the anus and external genitals of both sexes, are two pairs of membranous follicles, of which the lower and larger are pyriform, and contain an oily, viscid, highly odorous substance, secreted by glands which lie externally to the sac. This is the part used, but it is supposed by some that the upper follicles are the real castor sacs. They are removed on the death of the animal and dried by smoke or sun. The sacs are united in pairs by the excretory ducts; one pair larger than the other. They are divided internally into several coats, the outer being fibrous, underneath this are the glands from which the secretions issue. When cut or torn open, they present a reddish-brown color, intermingled more or less with the whitish membrane forming the cells. Appears in commerce singly or in pairs, in solid unctuous masses; about two inches long, more or less pyriform, much flattened and wrinkled, of a dark blackish-brown externally, more or less tinged with red. The Siberian var. is larger, more globular, plumper, less wrinkled, less tenacious, lighter internally, and of a stronger odor and taste than the American var. Strong, fetid, peculiar odor; bitter, nauseous, aromatic taste. Contains a number of substances, of which but little is known. Castorin (probably a fatty substance). Vol. oil (product of Salicin). Carbolic acid (doubtful whether it exists naturally, or is developed by mode of drying). Salicin (originating from their food—willows and poplars). The principal constituent is a resinous matter, of which it contains 58 per cent.

Water added to either tincture Am. Castor or tincture Sib. Castor, occasions a precipitate (lighter in the latter case), and when water of ammonia is added, the Siberian tincture clears, while the American tincture remains turbid.

Depressed, Globular; Hairy on One Side.

MOSCHUS. *M. moschiferus. Mammalia. Ruminatia.* Musk.

The animal bears a very close resemblance to the deer. Found in Asia, from 16° to 58° N. lat. The musk bag is situated in the rear of the abdomen, between the umbillicus and prepuce, and are in oval, hairy, projecting sacs—only found in the male. From two to three inches long by one to two broad, opening by a small hairy orifice at its anterior part, and marked posteriorly by a groove or furrow which corresponds with the opening of the prepuce. It is lined internally by a smooth membrane thrown into a number of irregular folds, forming incomplete partitions. The sacs are removed from the animal with a portion of the hide attached. The sacs of those three years and younger, contains a milky liquid. In the older, the secretions amount to about 1 ounce; but in the very old, this decreases to 3 drachms. The bags appear one side flat, the other more or less convex; general outline broad oval; the outer side is covered with stiff hairs arranged in a circular manner, forming a tuft or pencil around the aperture; the hairs are of a brown color tinged with white. After removal of hide, a muscular coat is observed, then comes the musk bag proper. This consists of several coats; the one next to the inner, being of a pearly appearance and folded in irregular meshes (these meshes contain the glands from which the musk is obtained.) The muscular coats are covered with epithelium. Musk, when fresh, is unctuous. In commerce it is granular, and mixed with hairs (this mixing occurs in the aperture). Of a very strong and persistent odor, increased by presence of moisture or ammonia; bitter, disagreeable, acrid taste. Factitious musk-bags are made from a portion of the hide of the animal, stitched and filled with various substances; they may be readily detected on close examination, by presence of the stitches, and by not having the spiral arrangement of the hairs. The musk after being removed from the bags, should be carefully examined for lead, &c. China musk (Tonquin) considered the best. Heated on platinum it is decomposed, evolving a urinous odor; burns with a white flame, leaving a gray ash. Sparingly soluble in strong alcohol; soluble in dilute alcohol and water. Odorous principle not yet determined (not a volatile oil.) Fat, wax and bile. Eight to ten parts of its constituents are soluble in alcohol; forty to fifty parts soluble in water.

LIQUID SECRETIONS.

Whitish; Taste Sweetish.

LAC. *Bos Taurus.* Milk.

Milk is an emulsion, consisting chiefly of water, in which is contained a peculiar kind of sugar (*lactin*), some saline constituents, and fat; the sugar and saline constituents are kept in solution by the water, and the fat in suspension by the proteid casein. Milk coagulates under various circumstances; naturally when undergoing fermentation, when acted on by various acids, &c. The protein compound is coagulated, the fat thrown out of suspension and *lactic acid* formed.

Brown-Green; Very Bitter.

FEL TAURI. *Bos Taurus.* Ox-bile.

This occurs naturally as a peculiar, ropy, greenish liquid, containing considerable mucilage, which is removed by the addition of twice its bulk of alcohol. The clear liquid then inspissated forms the medicine. It is then a dark greenish mass, of a peculiar odor, and of a strong, bitter taste. The taste is due to various constituents, and in these constituents a large number of coloring matters are found, some of which are decompositions of others. Bile, mixed with a solution of cane sugar, then with strong sulphuric acid, gives a blood-red color (soon becoming brown). This is known as Pettinkofers test, and is made use of for testing for both bile and sugar; but other carbohydrates, and it is also stated various protein compounds, respond to this reaction.

Table of Vegetable Antidotes and Incompatibles.

GENERAL TREATMENT;—I. Emetics, or stomach pump. II. Cathartics, when the poison is supposed to be in the intestinal tract. III. Artificial respiration. IV. Stimulants, diluents, and frictions to the surface of the body. V. When the nature of the poison is unknown, the following will be a harmless, yet to most poisons, efficacious antidote; R. Magnesia, carbonis ligni, ferri oxidi hydrati, *ana* equal quantities; aquæ *q. s.* Administer *ad libitum.*

ANTIDOTES.

Acidum Hydrocyanicum.	Inhalations of ammonia and chlorine; cold *douche;* ferric sulphate; sodic bicarbonate, atropia hypodermically.
Aconitum, and its preparations.	Digitalis; stimulants.
Belladonna and its allies, *Hyoscyamus* and *Stramonium,* and their preparations.	Ammonia; astringent infusions; coffee; cold to head; electricity; flagellation; opium; pepper; stimulants; oleum sassafras.
Camphora.	Stimulants; wine; opium.
Cantharis, and its preparations.	Camphor; copious draughts of milk; mucilaginous or oleaginous fluids; enemata of demulcents; opium.
Creasotum.	Albumen; gluten; milk; oil; flour.
Gambogia.	Potassic or sodic carbonate, or magnesia in milk; mucilaginous drinks; opium.
Gelsemium, and its preparations.	Morphia has been proposed.
Mezereum, and its preparations.	Albuminous and mucilaginous drinks; milk; oils and fats; albuminous enemata; cool poultices to abdomen; opium.
Oleum Amygdalae Amara.	(See Acidum hydrocyanicum).
Opium, and its preparations.	Vegetable astringents, belladonna; coffee; cold douche; flagellation; hyoscyamus; artificial respiration; stramonium; faradic current to phrenic nerves; epispastics; stimulants; comp. tr. iodinii; oxygen gas.
Quinia.	Emetics and cathartics; opium; coffee; brandy or wine; diffusible stimulants; diuretics and sudorifics as after-eliminatives.
Strychnia.	Chloroform; lobelia; opium; tobacco; tannin in excess; gallic acid; chloral hydrate; potassic bromide; monobromated camphor; *hot* bath; *forced* iusufflation of air; olive oil or lard.
Toxicodendron	Hypermanganate of potassium as an external application.
Veratrum viride, and its preparations.	Stimulants; digitalis; opium.
Vegetable.	Generally albuminous or mucilaginous drinks; oils, etc., stimulants; opium; soothing clysters; ice; cool poultices to abdomen, etc.

INCOMPATIBLES.

Absinthium.	Ferric and zincic sulphates; plumbic acetates; argentic nitrate; antimonic potassio-tartrate.
Acacia.	Alcohol; æther; lq. plumb. subacet.; tr. ferri chlor.
Emulsion.	Acids; oxymel; scillæ syr.; potassic tartrate and bitartrate; hydrargic bichloride; spr. æth. nitrosi; all spirits; all tinctures.
Acidum Citricum.	Sulphuric and nitric acids; plumbic acetates; hydrargic acetate and nitrate; alkalies and alkaline sulphurets.
Acidum Hydrocyanicum.	Metallic oxides; chlorine.
Acidum Tartaricum.	Alkalies and their carbonates; all potassic salts.
Aloes, (infs. comp).	Acids; acidulous salts; metallic salts.
Amygdal. (mistura).	Acids and all acidulous salts; spirits; tinctures; spr. æth. nitrosi; undistilled water.
Amylum, (mucilago).	Iodine and all its preparation.
Angustura.	Antimony; plumb. acetate; bichloride of mercury; infusion of galls or cinchona; nitrate of silver: sulphates of copper and iron; tartarized antimony.
Infusum.	Infus. galls and catechu; ferric and zincic sulphates; tartar emetic; argentic nitrate; plumbic acetates; hydrargic bichloride.
Anthemidis, (infusum).	Isinglass; infus. cinchonæ; ferric sulphate; argenti cnitrate; plumbic acetate.
Aurantii, (comp. infus).	Liquor calcis; infus. cinchonæ; ferric sulphate; plumbic acetate.
Balsamæ, (benzoic, peru, &c.).	Acids; alkalies.
Calumba.	Plumbic acetates; infus. gallæ.
Infusum.	Infus. gallæ and cinchonæ; antimonic potassio-tartrate; hydrargic bichloride; plumbic acetate; argentic nitrate.
Cannabis Indica.	Water and all infusions.
Camphoræ, (spiritus).	Water in any form.

Table of Incompatibles.

INCOMPATIBLES.

Capsicum.	Argentic nitrate; alkaline carbonate; plumbic acetates; hydrargic bichloride; cupric, ferric and zincic sulphates.
Caryophyllus.	Alkalies.
Cascarillæ, (infusum).	Infs, gallae and cinchonæ; plumbic acetates; argentic nitrate; ferric sulphate; liquor calcis.
Catechu, (infus comp).	Mineral acids; antimonic potassio-tartrate; gelatin; infus. cinchonæ, ferric and zincic sulphates; hydrargic bichloride.
Cinchonæ, (infusum).	Infus. of vegetable bitters and astringents; alkaline carbonates; liquor calcis; plumbic acetates; ferric and zincic sulphates; argentic nitrate; hydrargic bichloride; antimonic potassio-tartrate.
Cydoniæ, (infs)	Acids.
Digitalis, (infusum).	Ferric sulphate; plumbic acetate; infus. cinchonæ.
Emetia.	All vegetable astringents.
Gallæ.	Alkalies and their carbonates; vegetable alkaloids; argentic nitrate; cupric sulphate; chloride of mercury; lime-water; plumbic acetates; ferric iodide and sulphas: ant. et. pot. tartras; hydrargic nitrate; infus. cinchonæ; solution of isinglass or opium.
Gentianæ, (infus. comp).	Plumbic acetates.
Granatum.	Plumbic acetates; argentic nitrate; ferric iodide and sulphate.
Guaiacum.	Mineral acids and their salts; spir, æth. nitrosi; solution of chlorine.
Hæmatoxylon.	Mineral acids; acetic acid; alum: cupric and ferric sulphate; plumbic acetate; tartar emetic; opium; infus. cinchonæ
Ichthyocolla.	Alcohol; infus. astringents; potassic carbonate.
Ipecac.	Vegetable astringents and acids; plumbic acetate.
Kino.	Mineral acids and salts; alkalies and their carbonates; plumbic acetates: ferric sulphate: argentic nitrate; tartar emetic; hydrargic bichloride.
Krameria, (see Kino).	
Lini. (infus. comp.).	Alcohol; plumbic acetates.

Moschus, (mist. comp.).	Infus. cinchonæ; mineral acids; t ric sulphate.
Opium.	Liquor calcis; alkaline carbonat hydrargic bichloride; argentic trate; plumbic acetates; catech kino; infus. cinchonæ; cupric, f ric and zincic sulphates.
Tinctura.	Aqua ammonia; potassa, soda a their carbonates; metallic sal astringent vegetable infusion or coctions.
Quassia.	Argentic nitrate; plumbic acetate.
Quiniæ, (sulphas).	Alkalies and their carbonates; lim lime-water; salts of baryta a lead; argentic nitrate.
Rhei, (infusum).	Isinglass; mineral acids; argen nitrate; plumbic acetates; fer sulphate; tartar emetic; magnes hydrargic bichloride; infus. cinc næ·
Rosæ, (infusum).	Earths: alkalies: ferric and zin sulphates.
Salix.	Liquor calcis; ferric sulphate: all line carbonates; isinglass.
Sapo.	Acids; earths; alum; metallic sal astringents; hard water.
Sarsaparillæ, (infus. et decoct).	Liquor calcis; plumbic acetates.
Scilla.	Alkaline carbonates: aqua calc argentic nitrate: plumbic acetat gelatin.
Sennæ, (infusum).	All potassic salts.
Serpentariæ, (infusum).	Mineral acids; aqua calcis; alkali carbonates: argentic nitrate; plu bic acetates; hydrargic bichlorid infus. cinchonæ; tartar emetic.
Tamarindus.	Potassic and sodic carbonates a acetates; infus. sennæ; resino cathartics.
Taraxacum.	Argentic nitrate; ferric sulphat plumbic acetates; hydrargic bich ride; galls.
Tragacantha.	Cupric and ferric sulphate: plum acetate.
Ulmi, (infusum et decoct.).	Alcohol; tinctures, if to any gr amount.
Uva Ursi.	Ferric and plumbic salts: argen nitrate; tartar emetic; infus. c chonæ; opium: ipecacuanha; alk lies: with spr. æth. nitrosi, it said to form an explosive mixture
Valeriana.	Ferric salts: argentic nitrate; inf cinchonæ.
Violæ, (syrupus).	Acidulated and alkalized fluids stroy its blue color.

125
134
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ERRATA.

Jalapa, page 14; add to Off. Prep. Pulvis Jalapa Comp. Extractum.

Elaterium, page 14: Ecbalium *agresta*, read Ecbalium *agreste*.

Cell Development, page 35; *katos* read *kutos*; *blastis* read *blastos*.

Infloresence, page 44; read Inflorescence.

Cera Alba, page 188; read Oleum Camphoræ.

Pteroarpus, page 193; read Pterocarpus.

Lactucarium, page 195: wounding inspissated; &c., read wounding; inspissated, &c.

Acepenser, page 208; read Acipenser.

Granoidea, page 208; read Ichthyocolla.

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